IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

This **PHOTOFACT** Folder Set is

WIRE-SEALED FOR YOUR PROTECTION

to guarantee completeness of contents

DO NOT ACCEPT IF SEAL HAS BEEN BROKEN

TO OPEN ***JUST DO THIS:***

1

Take hold of the Set with both hands. Place your thumbs directly under the top wire-seal; then, divide the contents equally by putting your thumbs midway through the thickness of the Set. Now, pull the two sections apart at the top, firmly.

2

Repeat this process, pulling close to the wire-seal at the bottom, so that the set is now divided into two equal parts.

3

Continue this "pulling-apart" process with the section in which the wire-seals remain, dividing it in half.

4

Finally, remove the wire-seals left in the last section; this can easily be done with your fingernail or any sharp instrument.

Your "Safety-Sealed" PHOTOFACT Set is now ready for profit-making use . . .

IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

The PHOTOFACT® Servicer

SET 481 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ APRIL, 1960

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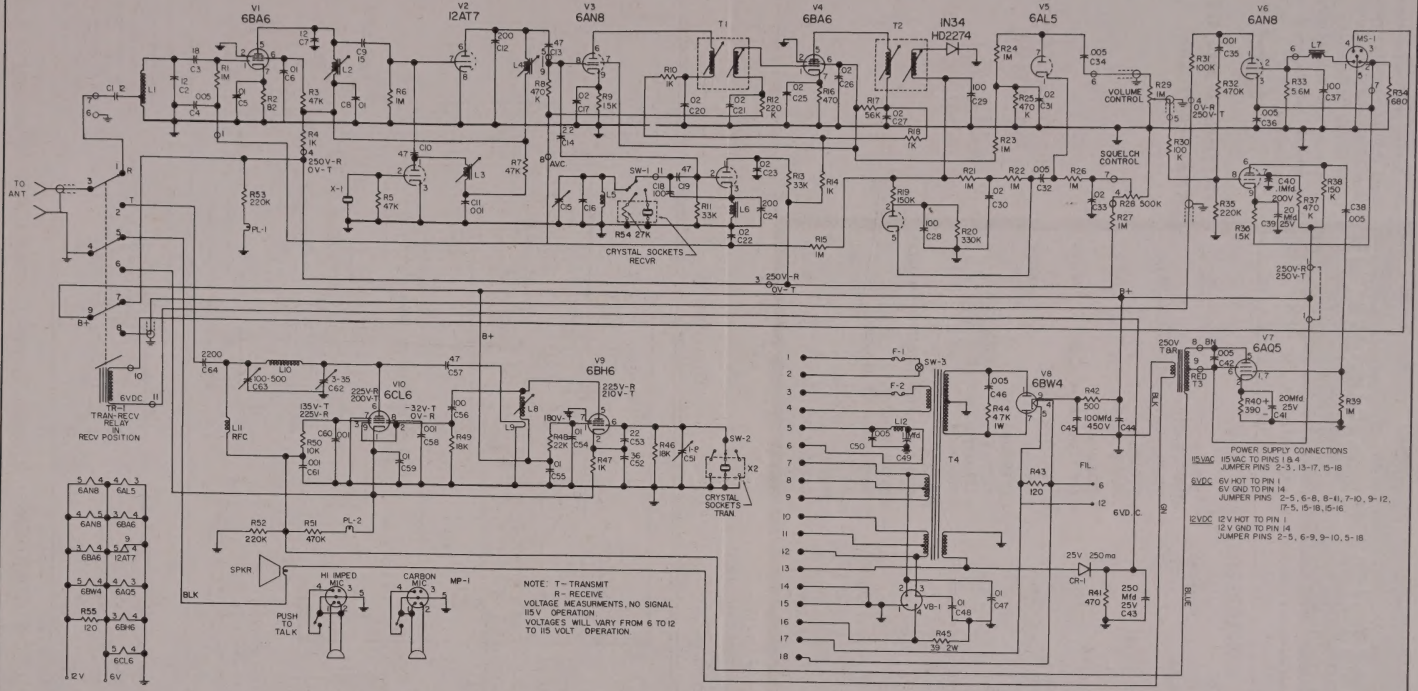
This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

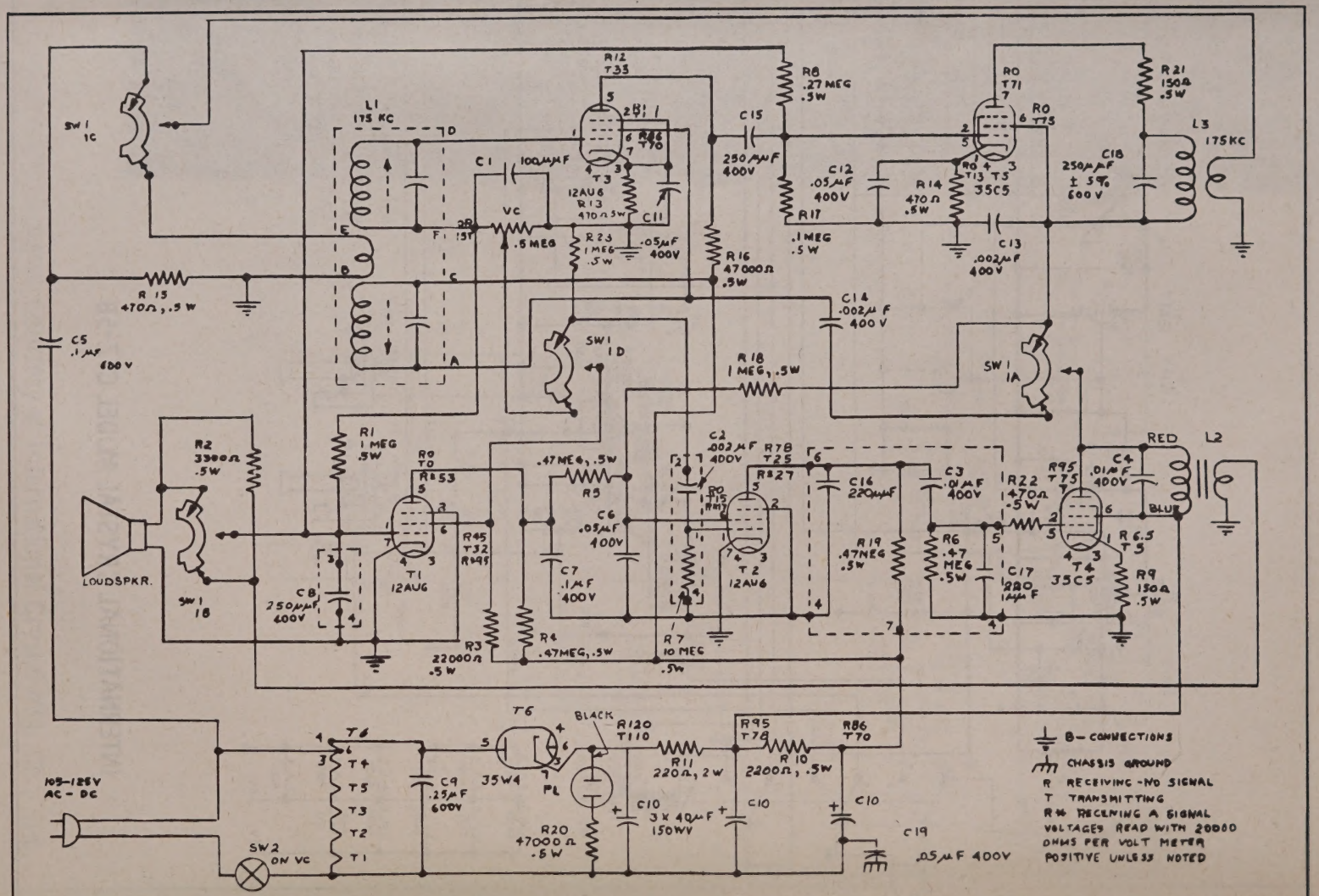
International Crystal
Model CTZ-5B

Vocaline Model
CC-60 (Vocatron)



INTERNATIONAL CRYSTAL MODEL CTZ-5B

Schematic Diagram Courtesy of International Crystal Mfg. Co., Inc.

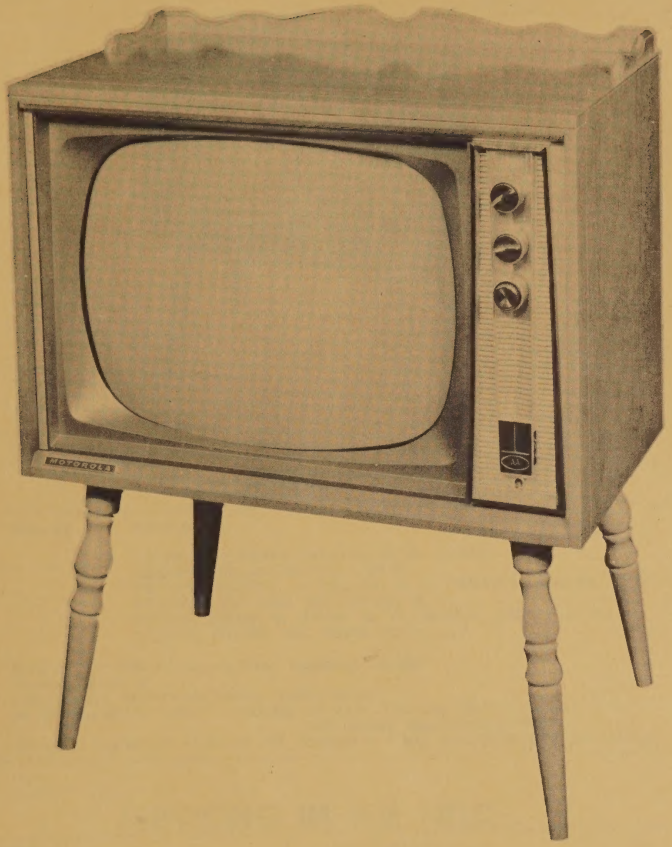


VOCALINE MODEL CC-60 (VOCATRON). Schematic Diagram Courtesy of Vocaline Company of America Inc.

PHOTOFACT® Folder

MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564

MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564



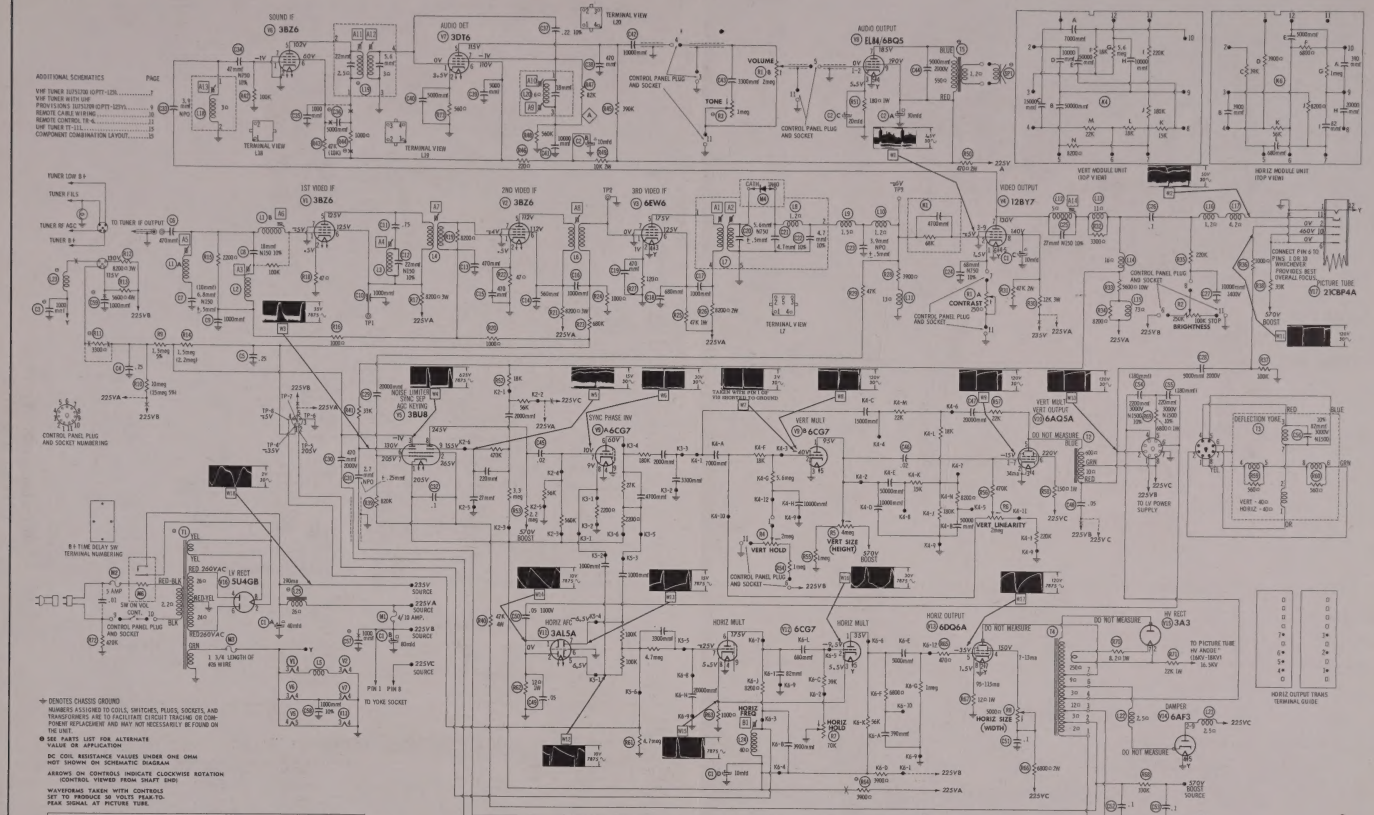
MODEL 21C10CW (Ch. TS-564)

MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SET 481 FOLDER 1


SOUND IF
AUDIO DET
AUDIO OUTPUT
TERMINAL VIEW L20
VOLUME
TONE
CONTROL PANEL PLUG AND SOCKET
VERT MODULE UNIT (TOP VIEW)
HORIZ MODULE UNIT (TOP VIEW)
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
VIDEO OUTPUT
CONTRAST
BRIGHTNESS
PICTURE TUBE
SYNC PHASE INV
VERT MULT
VERT OUTPUT
VERT LINEARITY
VERT HOLD
VERT SIZE (HEIGHT)
DEFLECTION YOKE
HORIZ AFC
HORIZ MULT
HORIZ OUTPUT
HORIZ FREQ
HORIZ HOLD
HORIZ SIZE (WIDTH)
HV RECT
DAMPER
B+ TIME DELAY SW TERMINAL NUMBERING
TO YOKE SOCKET
ADDITIONAL SCHEMATICS
PAGE
DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 58 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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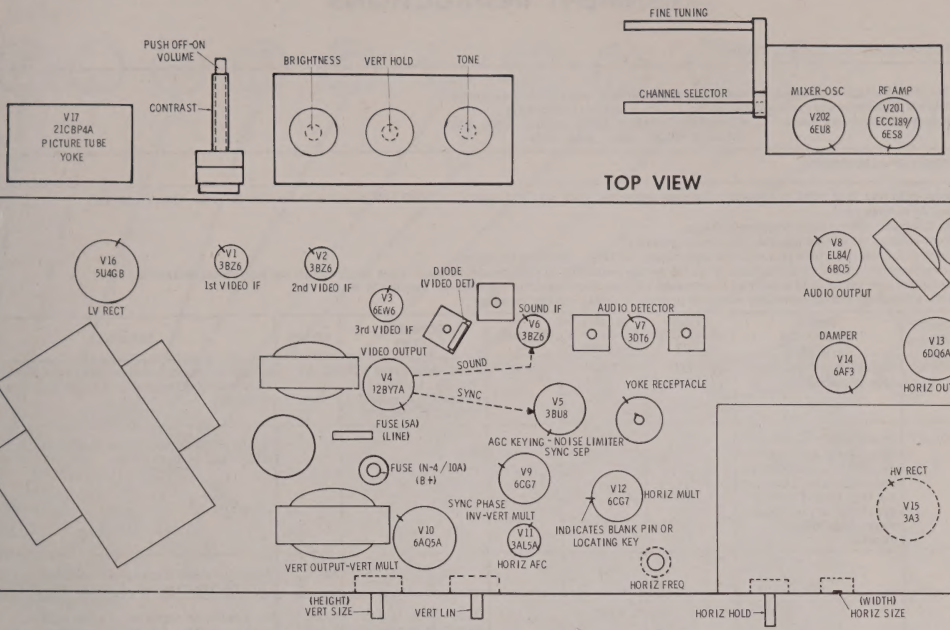
MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564

FOLDER 1

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

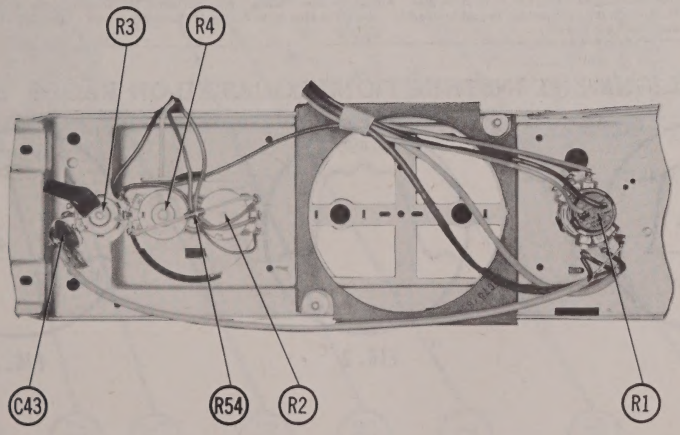
The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Fuse (Line), Fuse (B+), Fuse (Fil.), Thermal Sw, V16

SWEEP FAILURE
No raster, has sound V12, V13, V14, V15, V17
No vertical deflection V9, V10
Poor vert. linearity or foldover V9, V10
Poor horiz. linearity or foldover V12, V13, V14
Narrow picture V12, V13, V14, V16
Vert. off freq. V9
Horiz. off freq. V11, V12

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V17
Has pic, no sound V6, V7, V8
Overloaded picture V5

SYNC FAILURE
No vert. sync V5, V9
No horiz. sync V5, V9, V11
No vert. or horiz. sync V5, V9



CONTROL PANEL

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Short grid (pin 2) of V202 to chassis. Remove deflection yoke plug and connect a 1500Ω 50W resistor from TP7 to TP6. CAUTION: TP7 has B± voltage on it.
Set Contrast control fully counterclockwise.
Short antenna terminals together but not to chassis.
Connect the negative lead of a 4.5 volt bias supply to TP4. Positive to chassis.
Connect synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001mfd	High side to TP2. Low side to chassis.	44.0MC (10MC Swp)	45.75MC	13	Vert. Amp. thru 47K to TP3. Low side to chassis. (Across Video Det. load)	A1, A2	Adjust for maximum gain and symmetry of response similar to Fig. 1. with markers as shown.
2.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	"	47.25MC	"	"	A3, A4	Adjust to place marker in trap notch. (Slug away from chassis).
3.	"	"	"	41.25MC	"	"	A5	Adjust to place marker in trap notch. (Slug toward chassis).
4.	"	"	"	44.0MC	"	Vert. Amp. to TP1. Low side to chassis.	Mixer Plate Coil & A6	Set generator output for 3 volts peak to peak on scope. Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown. Mixer Plate Coil affects center peak and A6 affects outside peaks. (Slugs away from chassis).
5.	"	"	"	42.25MC 45.75MC	"	Vert. Amp. thru 47K to TP3. Low side to chassis.	A7, A8	Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. Adjust A7 to place 42.25MC marker and A8 to place 45.75MC marker. If necessary, retouch Mixer Plate coil to correct for tilt.

SOUND IF ALIGNMENT

Tune in a strong TV signal and adjust controls for normal picture and sound. Connect the DC probe of a VTVM to point (A). Common to chassis. Adjust A9 for maximum deflection choosing the one of two peaks which produces the highest voltage. While listening to the sound, retouch A9 for maximum volume with MINIMUM distortion. The top slug (A10) is a preset slug which is set near the top of the coil form and left there. Change to a very weak signal (this may be done by loosely coupling the antenna lead to the antenna terminals) that produces a hiss in the sound. Adjust A11 and A12 for maximum sound and MINIMUM distortion. Adjust A13 for maximum undistorted sound. If sound is not clear at this point, repeat the above procedure.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and turn the Contrast fully clockwise. Adjust the Fine Tuning until a strong 4.5MC beat pattern is visible. Adjust A14 to find the two points at which the beat pattern is just noticeable. Tune the slug to the center of these two points. (Use MINIMUM inductance which will result in no apparent beat pattern).

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 8 & 17

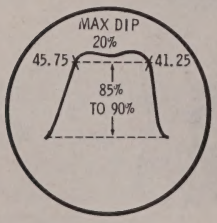


FIG. 1

FIG. 2

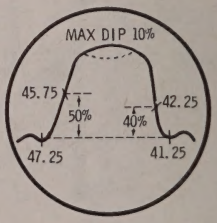
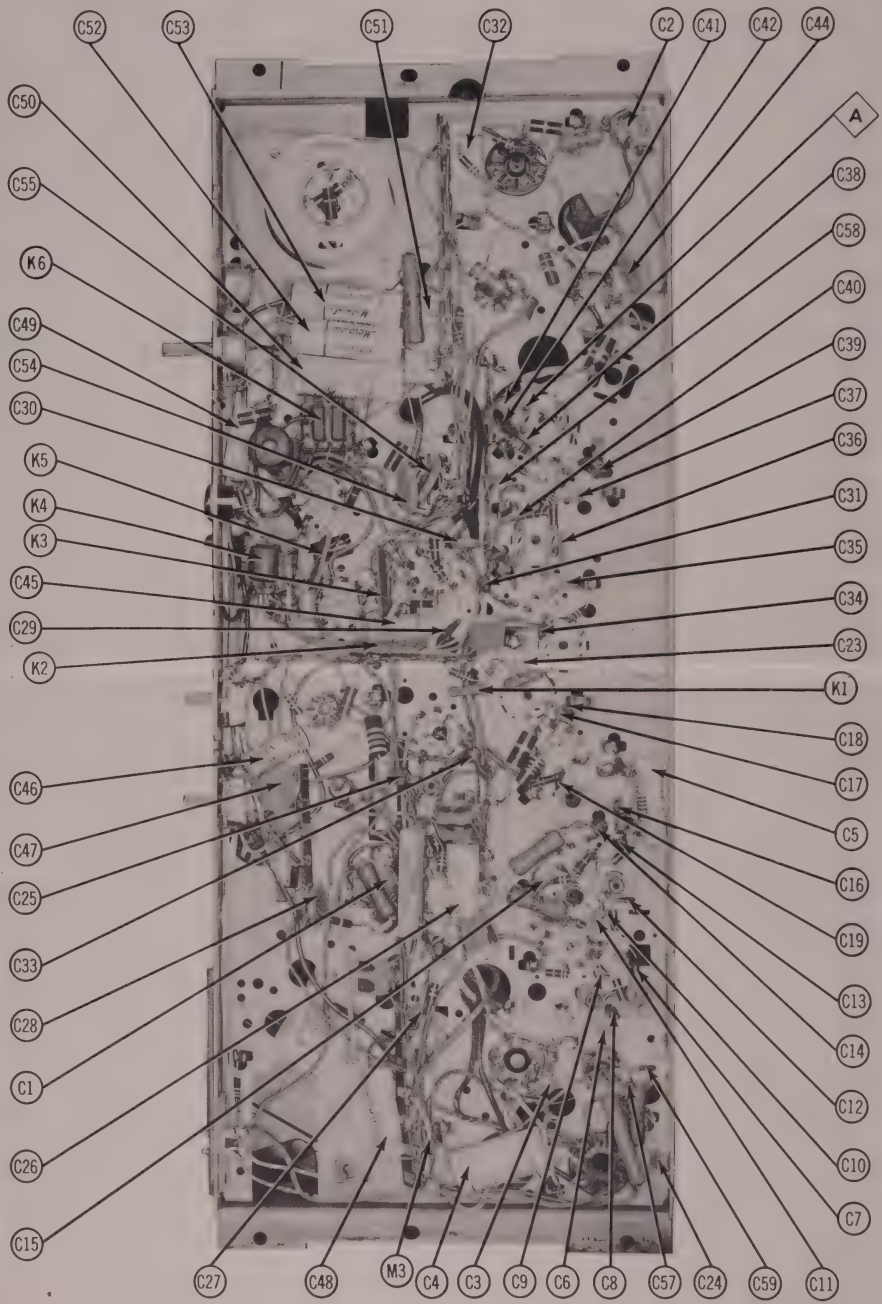


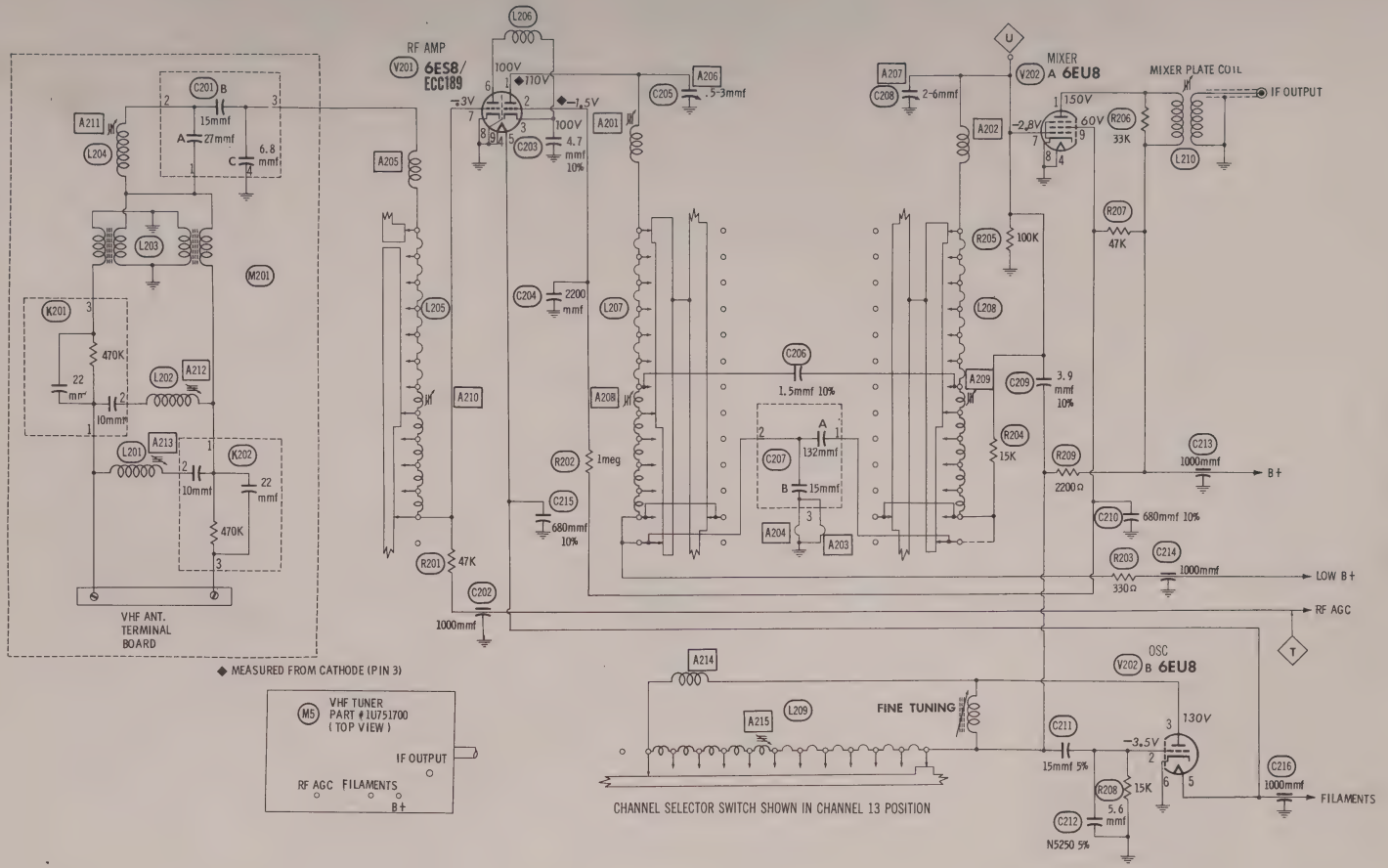
FIG. 3



CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.

MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564

CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT.



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VHF TUNER 1U751700 (OPTT-123)

MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564

TUNER ALIGNMENT INSTRUCTIONS

OPTT–123, OPTT–123Y

PRE-ALIGNMENT INSTRUCTIONS

Remove the deflection yoke plug to prevent interference radiation. Connect a 1500Ω 50 watt resistor from pin 3 to pin 5 of the Service Test Receptacle.
DO NOT remove the tuner cover.
Suggested Alignment Tools: A206, A207 ..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525
A208 thru A213... GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547

VHF RF AND MIXER ALIGNMENT

Connect a clip lead from point (T) to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Preset A206 and A207 so top of screw is .35" above tuner chassis.
Use 10MC sweep unless otherwise noted.

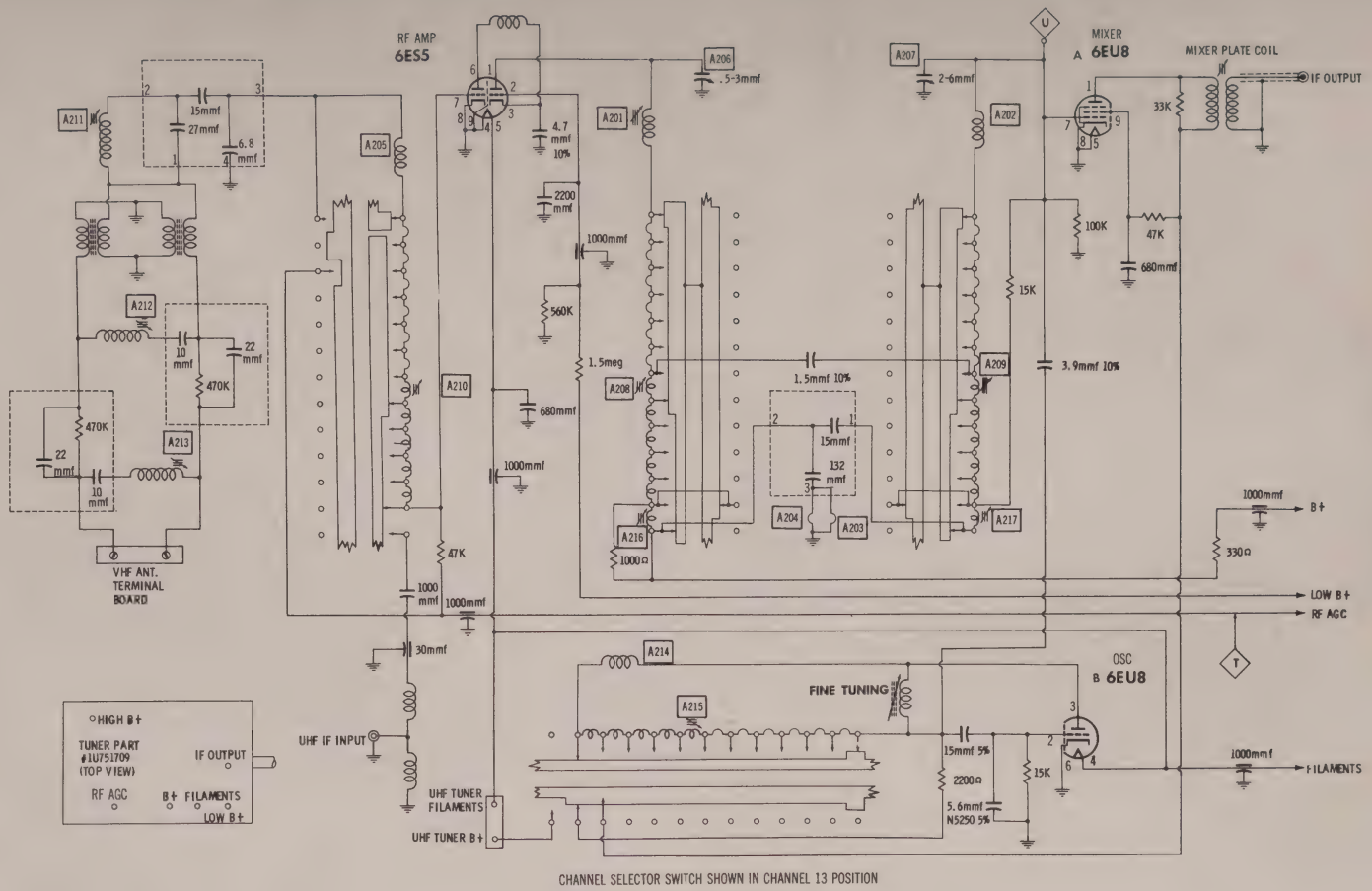
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point U . Low side to chassis.	A201, A202	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown.
2.	"	"	"	"	"	"	A203, A204	Adjust for proper bandwidth as in Fig. 201.
3.	"	"	"	"	"	"	A205	Adjust for maximum amplitude and MINIMUM tilt.
4.	"	"	177MC	175.25MC 179.75MC	7	"	A206, A207	Adjust A206 for proper marker position. Adjust A207 for MINIMUM tilt.
5.	"	"	85MC	83.25MC 87.75MC	6	"	A208, A209, A210	Adjust A208 to place 83.25MC marker on or near peak, A209 to place 87.75MC marker on or near other peak and A210 for maximum gain and MINIMUM tilt.
6.	"	"	"	94MC	"	"	A211	Adjust for MINIMUM response at marker or until it just starts to affect the high frequency side of response curve. NOTE : A211 may be adjusted to trap out interference between 85 and 108MC. However, make certain that no part of a desired channel is trapped out.
7.	"	"	79MC	77.25MC 81.75MC	5	"		Check for response similar to Fig. 201. If necessary make compromise adjustment of A208, A209 and A210 for proper curve on each channel.
			69MC	67.25MC 71.75MC	4			
			63MC	61.25MC 65.75MC	3			
			57MC	55.25MC 59.75MC	2			
8.	"	"	57MC	43.5MC 45.5MC	2	"	A212, A213	Adjust A212 for MINIMUM response at 43.5MC marker and A213 for MINIMUM response at 45.5MC marker. Retouch either or both for flat response consistent with MINIMUM amplitude at trap frequencies.

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	215.75MC	13	Vert. Amp. thru 47K across Video Det. load	A214	Adjust to place marker in trap notch as in Fig. 202.
10.	"	"	207MC	209.75MC	12	"		Marker must fall into trap notch on each channel within plus or minus 750KC of specified marker frequency. If not, make compromise adjustment of A214 for all high band channels.
			201MC	203.75MC	11			
			195MC	197.75MC	10			
			189MC	191.75MC	9			
			183MC	185.75MC	8			
			177MC	179.75MC	7			
11.	"	"	85MC	87.75MC	6	"	A215	Adjust to place marker in trap notch as in Fig. 202.
12.	"	"	79MC	81.75MC	5	"		Marker must fall into trap notch on each channel within plus or minus 750KC of specified marker frequency. If not, make compromise adjustment of A215 for all low band channels.
			69MC	71.75MC	4			
			63MC	65.75MC	3			
			57MC	59.75MC	2			

Continued PAGE 17



CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

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VHF TUNER with UHF Provisions 1U751709 (OPTT-123Y)

MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564

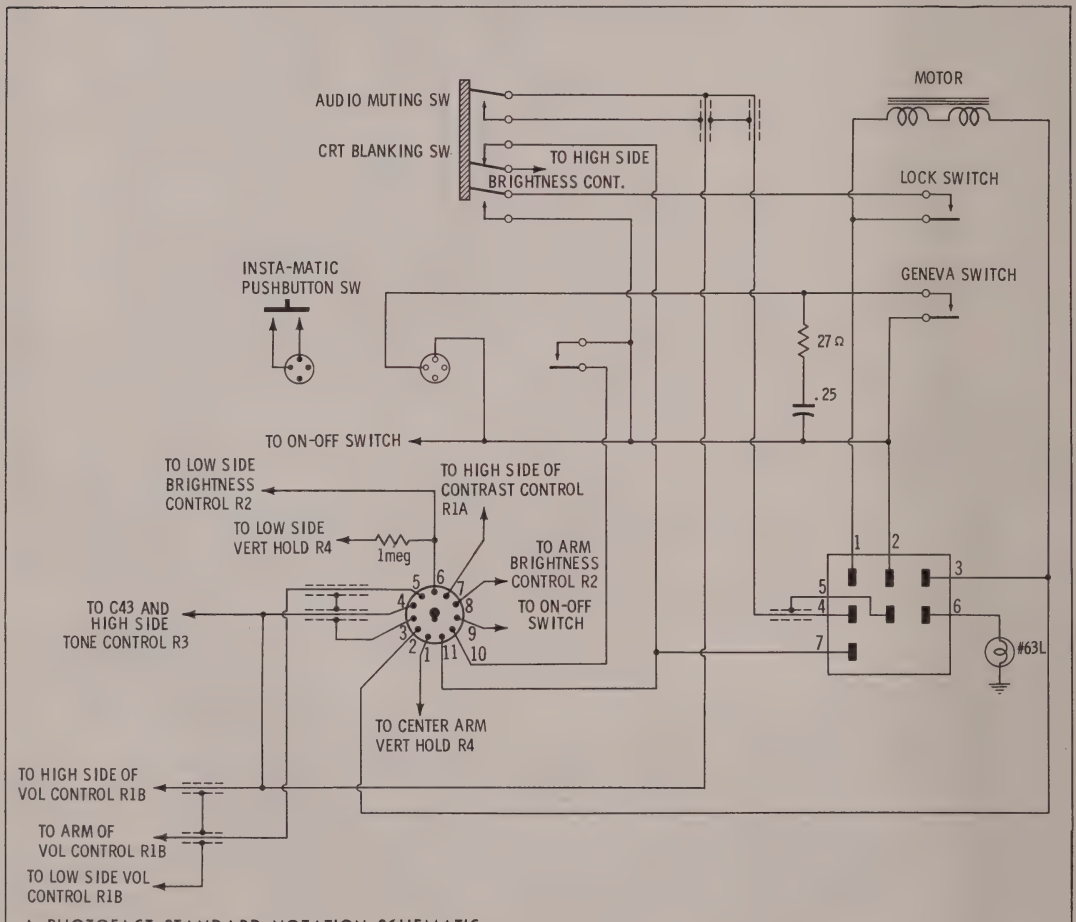
FOLDER 1

ALIGNMENT INSTRUCTIONS

REMOTE CONTROL

TR-6

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Audio generator across microphone input	39.0KC		DC probe thru 100K to point (A). Common to chassis.	A1	Detune A2 by turning counterclockwise several turns. Adjust A1 for maximum deflection. Use only enough generator output to provide a usable indication on VTVM.
2.	"	"		DC probe thru 100K to point (B). Common to point (C).	A2	Increase generator output to cause overload. Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
3.	"	40KC		DC probe thru 100K to point (A). Common to chassis.	A3	Reduce generator output below overload. Adjust for maximum deflection. Peak core away from chassis.
4.	"	41.5KC		DC probe to point (D). Common to chassis.	A4	Adjust for MINIMUM deflection. Keep adjusting generator output during this adjustment so that meter reading remains between 3 and 5 volts.


AUDIO MUTING SW
CRT BLANKING SW
TO HIGH SIDE BRIGHTNESS CONT.
MOTOR
LOCK SWITCH
GENEVA SWITCH
INSTA-MATIC PUSHBUTTON SW
27 Ω
.25
TO ON-OFF SWITCH
TO LOW SIDE BRIGHTNESS CONTROL R2
TO HIGH SIDE OF CONTRAST CONTROL R1A
TO LOW SIDE VERT HOLD R4
1meg
TO ARM BRIGHTNESS CONTROL R2
TO ON-OFF SWITCH
TO C43 AND HIGH SIDE TONE CONTROL R3
#63L
TO CENTER ARM VERT HOLD R4
TO HIGH SIDE OF VOL CONTROL R1B
TO ARM OF VOL CONTROL R1B
TO LOW SIDE VOL CONTROL R1B

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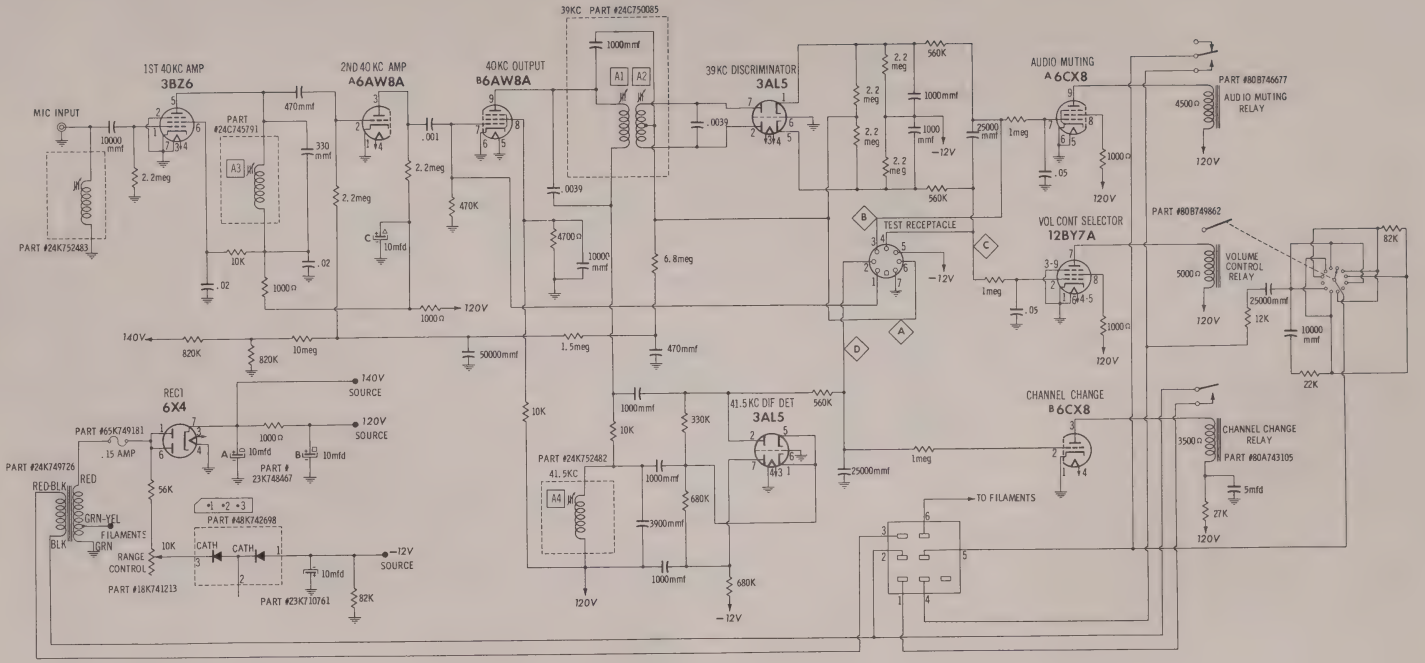
REMOTE CABLE WIRING



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REMOTE CONTROL TR-6

TS-564, TS-564Y, WTS-564

MOTOROLA CHASSIS

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No	CBS	GENERAL ELECTRIC	RAYTHEON	SYLVANIA
	USE	TYPE	USE	TYPE
V1	1st Video IF Amp.	3BZ6		
V2	2nd Video IF Amp.	3BZ6		
V3	3rd Video IF Amp.	6EW6		
V4	Video Output	12BY7A		
V5	AGC Keying-Noise Limiter-Sync Sep.	3BU8		
V6	Sound IF	3BZ6		
V7	Audio Detector	3DT8		
V8	Audio Output	6L6G/6P45		
V9	Vert. Mult. - Sync Phase Inverter			6CQ7
V10	Vert. Mult. - Vert. Output			6AQ5A
V11	Horiz. AFC			3AL5A
V12	Horiz. Mult.			6CG7
V13	Horiz. Output			6DQ5A
V14	Damper			6AF3
V15	HV Rectifier			3A3
V16	I.V. Rectifier			5U4GB

PICTURE TUBE

ITEM No	MOTOROLA PART No	GENERAL ELECTRIC PART No	RCA PART No	RAYTHEON PART No	SYLVANIA PART No	NOTES
			REPLACEMENT DATA			
V17	21CBP4A	21CBP4A ①	21CBP4-A ①	21CBP4/21CBP4A	21CBP4/21CBP4A	① Aluminized ② ③ "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP	RATING VOLT	MOTOROLA PART No	ABBOTT PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
					REPLACEMENT DATA				
C1A	●40	350	ATH4-05-80	D0044	FP420-46	TMQ-143	TVL-4710. 2		
B	●80	300							
C	●20	300							
D	10	300							
C2A	●30	300	23KT3879D	AFH3-108	C6BG	FP330. 7	TMT-93	TVL-3635. 5	
B	●10	300							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING	REMARKS	REPLACEMENT DATA ABBOTT PART No.	CORNELL DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	1000	Note 1	BPD-101	DD-102	BYA10CH	CCD-102	GP3D	SHK-D5
C4	30 1000V		P388M-35		CUB2F3S	1DP-3-354	GEM-301	ETM-P35
C5	22 100V		P388M-35		CUB2F2S	1DP-3-354	GEM-201	ETM-P25
C6	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TG-T47	
C7	5 8 N150 ± .5mmf	(10mmf) †	#2R130578			*		10TCP-V68	
C8	15 N150 10%	#2R130578				*		10TCP-Q18	
C9	1000		BPD-001	DD-103	BYA10DH	CCD-102	GP3D	SHK-D10	
C10	1000		EF-001	MFT-1000		CCF-102	CT380A		
C11	75	#2K375S33				*		10TCP-G22	
C12	22 N150 10%	#2R130510				*		10TCP-G22	
C13	68		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TG-T47	
C14	580		DI-580	DD-581	L20T58	CCD-581	GP358	10TG-T58	
C15	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TG-T47	
C16	1000		BPD-001	DD-102	BYA10DI	CCD-102	GP3D	SHK-D05	
C17	1000		BPD-001	DD-103	BYA10DH	CCD-102	GP3D	SHK-D10	
C18	680		BPD-00068	DD-681	BYA10T68	CCD-681	GP368	10TG-T68	
C19	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TG-T47	
C20	5.8 N750 ± .5mmf	#2R129194							
C21	4.7 10%	NPO-81 4.7	TCZ-4R7	C10V47C	CCD-4R7	CNO-547	10TCC-V47		
C22	4.7 10%	NPO-81 4.7	TCZ-4R7	C10V47C	CCD-4R7	CNO-547	10TCC-V47		
C23	3 3 NPO ± .5mmf	#2R119563		C10V3C			10TCC-V39		
C24	68 N750 10%	N750-D1 68	DTN-68	C10Q68U	CCTN-680	CNT-468	10TCU-Q68		
C25	27 N150 10%	#2R119896					10TCP-Q27		
C26	1 .400V		P488M-1	DF-104	CUB4P1	4DP-3-104	GEM-401	ETM-P1	
C27	10000 1400V		DAC-37		DD68-103	HVE16S	16DP-3-103	UAC-110	BL-B10
C28	5000 2000V				BYC2D5S	HVC2D5S	3CCD-502	3EY-347	BL-D50
C29	20000		BPD-03		BYB6S2		CCD-303	GP130	SHK-S20
C30	10000 2000V		BPD-103		BYB10S2	HVB10S2	3DCD-103	3EY-347	3DGA-T47
C31	2.7 NPO ± .25mmf	#2R126599							10TCC-V27
C32	1 400V		P488M-1	DF-104	CUB4P1	4DP-3-104	GEM-401	ETM-P1	
C33	3 9 NPO	#2R119563			C10V4C				10TCC-V39
C34	47 N750 10%	N750-D1 47	DTN-47		C10Q47U	CCTN-470	CNT-447	10TCU-Q47	
C35	1000		BPD-001	DD-102	BYA10DI	CCD-102	GP3D	SHK-D9	
C36	5000	Note 1	BPD-005	DD-502	BYA10D5	CCD-502	GP3D	SHK-D50	
C37	22 10%	#2K747200							
C38	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TG-T47	
C39	5000		BPD-005	DD-501	BYA10D5	CCD-502	GP3D	SHK-D50	
C40	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP3D	SHK-D50	
C41	10000		BPD-01	DD-103	BYA10DI	CCD-102	GP3D	SHK-D10	
C42	10000		BPD-01	DD-103	BYA10DI	CCD-103	GP10	SHK-S10	
C43	3300		BPD-033	DD-332	BYA10D3	CCD-331	GP33	SHK-D33	
C44	5000 2000V			DD80-502	HVC2D5	3CCD-502	3EY-347	BL-D50	
C45	.02 600V		P688M-02	DD-203	CUB6S2	6DP-3-203	GEM-612	ETM-S2	
C46	.02 600V		P688M-02	DD-203	CUB6S2	6DP-3-203	GEM-612	ETM-S2	
C47	200		BPD-02	DD-203	BYB6S2	CCD-203	GP20	SHK-S20	
C48	05 400V		P488M-05	DD-503	CUB4S	4DP-3-503	GEM-415	ETM-S5	
C49	05 200V		P488M-05	DD-503	CUB2S	2DP-3-503	GEM-215	ETM-S5	
C50	05 1000V		P1088M-05		CUB10S	10DP-5-503	GEM-1015	10TM-S5	
C51	.1 400V		P488M-1	DF-104	CUB4P1	4DP-3-104	GEM-401	ETM-P1	
C52	.1 600V		P688M-1	DF-104	CUB6P1	6DP-4-104	GEM-601	ETM-P1	
C53	.1 600V		P688M-1	DF-104	CUB6P1	6DP-4-104	GEM-601	ETM-P1	
C54	220 1000V N1500 10% (180mmf) *								
C55	220 1000V N1500 10% (180mmf) *								
C56	82 2000V N1500 10%								
C57	1000	Note 1	BPD-001	DD-102	BYA10DI	CCD-102	GP3D	SHK-D10	
C58	1000 10%		DI-1000	DD-102	PMR2S	CCD-102	GP3D	10TG-D10	
C59	1000	Note 1	BPD-001	DD-102	BYA10DI	CCD-102	GP3D	SHK-D10	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
† Alternate Value (Part #2R129194). ‡ Alternate Value.
# Motorola Part No. Note 1. Not used in some versions.

CONTROLS

ITEM No	RATING RESIST ANCE	RATING WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
					REPLACEMENT DATA			
R1A	2500		18KT9205					Contrast
B	2meg						●U24075-8	Volume
C	Switch							Push-Pull Oil-On
R2	250K		18KT5209				TA184L	Brightness, 100K Stop
R3	1meg		18KT5294					Tone, Note 1
R4	2meg		18KT5020				TA36L	Vert. Hold

CONTROLS (cont)

ITEM No	RATING RESIST ANCE	WATTS	REPLACEMENT DATA MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R5A	4meg		18KT3434			B1I-240 TM4	PTA5L	Vert. Size
B	Shaft					Not Req.	Not Req.	
R6A	1meg	1	18KT4353		B4T-2meg-S Not Req.	B1I-232 TM4	PTA3L Not Req.	Vert. Lin.
B	Shaft					Not Req.	Not Req.	
R7A	1MK	1	18KT4235			B1I-245 TM4	PTA3L Not Req.	Horiz. Hold
B	Shaft					Not Req.	Not Req.	
R8A	500Ω	1	17KT4689	WN-502	A4S-500	W4S-500	PT5K6	Horiz. Size
B	Shaft			Not Req.	Not Req.	Not Req.	Not Req.	

Note 1. Some versions may use 1meg Tone control (Part #18KT3201).
■ "STA-LOC" Equivalent: FB25L1, RUP25S1, OS37S.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING	REMARKS	ITEM No	RATING	REMARKS	ITEM No	RATING	REMARKS
R9	1.5meg 5%		R31	47K 2W		R53	2 2meg	
R10	10meg	(35meg 5%) *	R32	220Ω		R54	1meg	
R11	3300Ω	Note 1	R33	68000 10W	#17KT4879	R55	1meg	
R12	8200Ω 3W		R34	8200Ω		R56	470K	
R13	39000 4W		R35	220K		R57	22K	
R14	1.5meg	(3. 2meg)*	R36	1000Ω		R58	150Ω 1W	
R15	2200Ω		R37	100K		R59	560Ω	
R16	1000Ω		R38	33K		R60	560Ω	
R17	8200Ω 3W		R39	82K		R61	4.7meg	
R18	47Ω		R40	47K 4W		R62	120 1W	
R19	8200Ω		R41	22K		R63	1000Ω	
R20	1000Ω		R42	100K		R64	3900Ω	Note 1
R21	8200Ω 3W		R43	47K	(39K) *	R65	470Ω	
R22	47Ω		R44	1000Ω	Note 1	R66	68000 2W	
R23	680K		R45	390K		R67	120 1W	
R24	1000Ω		R46	220Ω		R68	470K	
R25	47K 1W		R47	82K		R69	68000 1W	
R26	8200 2W		R48	560K		R70	6.2K 1W	
R27	130Ω		R49	10K 2W		R71	22K 1W	
R28	470K		R50	4700 2W		R72	470K	
R29	47K		R51	180Ω 1W		R73	560Ω	
R30	1K 5W		R52	33K				

* Motorola Part No. * Alternate value. Note 1. Not used in some versions.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Video Output Grid	470mmf, 8kK	SIKT44975	
K2	Sync Sep & Vert Phase Inv	270mf, 1000mmf, 2000mmf, 56K, 56K, 470K, 560K, 2.2meg	SIBT47893	Sprague HN-5
K3	Vert. Integrator	2000mmf, 3300mmf, 4700mmf, 220KΩ, 220KΩ, 27K, 180K	SIBT47879	Sprague VF-3
K4	Vert. Sweep	7000mmf, 10000mmf, 12000mmf, 15000mmf, 20000mmf, 5000mmf, 6800Ω, 15K, 18K, 18K, 22K, 180K, 220K, 5.6meg	SIC74921	
K5	Horiz. AFC	1000mmf, 1800mmf, 3300mmf, 100K, 100K, 4.7meg	SIBT47586	Sprague V-4
K6	Horiz. Sweep	52mmf, 390mmf, 680mmf, 3900mmf, 5000mmf, 20000mmf, 390Ω, 680Ω, 820Ω, 39K, 56K, 1meg	SIC74HK	

COILS (RF-IF)

ITEM No	USE	REPLACEMENT DATA MOTOROLA PART No.	Gramer PART No	Meissner PART No	Merit PART No	Miller PART No.	Ram PART No.	NOTES
L1A	41. 25MC Trap	24KT47586						
B	1st Video IF							
L2	47. 25MC Trap	24KT50578	17-4538 ▲	17-4539 ▲	TV-158 ▲	6236 ▲		
L3	47. 25MC Trap	24KT47585	30-1049	30-1049	TV-158 ▲	6236 ▲		
L4	2nd Video IF	24KT47587	17-4522	17-4522	TV-130	6229	VF-3	
L5	Fil. Trap	24KT48795	19-1001	19-1001	BC-562	6604		1.5ph
L6	3rd Video IF	24KT51349	17-4522	17-4522	TV-130	6229	VF-3	
L7	4th Video IF	24KT50722 ‡						
L8	Fil. Trap	24KT48885						8.5ph
L9	Resonant Choke	24KT53235						10uh
L10	Resonant Choke	24KT48889						8.5uh
L11	Shunt Peaking Coil	24KT49659	19-3330	19-3330	TV-320	6133	VP-7	330uh
L12	4. 5MC Trap	24KT50295	30-1004 ▲	30-1004 ▲	TV-158 ▲	6189 ▲	EF-3	
L13	Series Peaking Coil	24KT52351	19-3275 ▲	19-3275 ▲	TV-168 ▲	6150 ▲	VP-5 ▲	270uh ▲
L14	Shunt Peaking Coil	24KT49659	19-3330	19-3330	TV-320	6174	VP-8	330uh
L15	Shunt Peaking Coil	24KT53293	19-1050 ▲	19-1050 ▲	BC-549 ▲	6303 ▲		2.5MH ▲
L16	Resonant Choke	24KT49989						8.5uh
L17	Series Peaking Coil	24KT50935	19-3100	19-3100	TV-194	6113		104uh
L18	1st Sound IF	24KT51459						
L19	2nd Sound IF	24KT53234 *	17-3495	17-3495	TV-13	6303	SF-3	
L20	Quadrature Coil	24KT51421					BD-5	
L21	RF Choke	24KT47171				4611		7.5uh
L22	RF Choke	24KT47171				4611		7.5uh
L23	Fil. Choke	24KT47675	19-1001	19-1001	BC-562	4604		1.5uh ①

† Includes M4. ▲ Disregard tap. ‡ Parallel with 4300Ω resistor.
* Alternate Part #24KT51498 ■ Parallel with 3300Ω resistor.
① Includes 33000Ω Resistor (R32).
② Includes 82000Ω Resistor (R34).
Not used in some versions.

TRANSFORMER (HORIZ. OSC.)

ITEM No	DC RES. PRI.	DC RES. SEC	REPLACEMENT DATA MOTOROLA PART No.	Halldenson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordenson PART No.	NOTES
L24	40Ω	24KT43428	R8-5 ①	TV-105 ②	6203 ①	H-103 ①	R8-5 ①		Horiz. Stabilizer ① Enlarge mtg. hole. ② Disregard tap.

FILTER CHOKE

ITEM No	RATINGS CURRENT (Measured)	RATINGS DC RES	RATINGS INDUCTANCE @ CURRENT 1000 (*)	REPLACEMENT DATA MOTOROLA	Halldenson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordenson PART No.	Triad PART No.
L25	275A	25Ω	92 Hy	33KT8178A1Y ①	38C25	C-2696	F-801	C-1225	25C93	C-27X

① Alternate Part #33KT8178J.

TRANSFORMER (POWER)

ITEM No	RATING PRI.	SEC. 1	SEC. 2	MOTOROLA PART No	Halldenson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordenson PART No	Triad PART No
T1	117V ② L. 75A	320VCT @ 300A	5V @ 3A	25KT5286W ①						

① Alternate Part #20D765778.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	MOTOROLA PART No	Halldenson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordenson PART No	Triad PART No
		REPLACEMENT DATA						
T2	Vert. Output	25KT4497A	25S73 ①	A-2855	V26 ②	VO36	25S73 ①	A-153X
T3	Yoke-Horiz. (53MH) (90°)-Vert. (19MH)	24KT47585	Y-45 ① ② $ $	MDF-57 ① $ $	MD-8		DY-32A	Y-45 ① ② $ $		Y-45-2 TC-1 CL-1
T4	Rear Cover & Centering Device Yoke Retainer & Clamp	59CT8148								D-178
	Horiz. Output	24KT48297 ①		HVO-1423 ①						
	Primary Coil	24KT48398			MOC-2					
	Secondary Coil	24KT45108		MT-3						

① Drill new mounting hole(s).
② Cut and tape green lead.
③ Remove jumper from yoke terminals #3 and #6. ,
④ Remove horizontal damping capacitor from yoke terminals #1 and #3 and install across #3 and #7.
⑤ Use original leads, slug, rear cover & core clamp assembly. Connect same as original.
⑥ Remove jumper from yoke terminals #1 and #4.
⑦ Complete transformer assembly.
$ Exact replacement.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	MOTOROLA PART No.	Halldenson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordenson PART No.	Triad PART No.	NOTES
			REPLACEMENT DATA							
T5	5000Ω	6-8Ω	25KT4920-2 ①	24S07	A-2601	AU-500	A-3013	24S07	S-53X	① Alternate Part #25KT4920

SPEAKER

ITEM No	TYPE SIZE	FIELD	V. C. IMP	REPLACEMENT DATA MOTOROLA PART No.	QUAM PART No.	NOTES
SP1	4"	PM	8-8Ω	50KT4195 ①		① 8C and 8T Series Models
	5"	PM		50KT4189 ②		② 21K23B, M, 21K27CW, A2K634M, A2K640B, M, Y2K22B, M, Y2K27CW Models
	6"	PM		50KT4188 ③		③ 21K29B, M, MC, 21K30CW, Y2K29B, M, MC, Y2K30CW Models
	6" x 9"	PM		50KT4191 ④		④ 21K28B, M, Y2K28B, M, W Models
	8" x 9"	PM		50KT4190 ⑤		⑤ 21K26B, M, W, A2K24CW Models
	4"	PM				# Not used in 8C and 8T Series Models

FUSES

ITEM No	TYPE	RATING	MOTOROLA PART No. FUSE	MOTOROLA PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No.	NOTES
			REPLACEMENT DATA					
M1	N	4/10A 8A	65KT8057B	9KT5057A	333. 400 (N 4/10A 250V 8/8)	346009	N 4/10	BW 3/10 to 1/2
M2	3AG	5A	65A743B2	31AT37466	312005 (3AG 5A 250V	357001	MTH5	4406
M3	1 3/4 " Length	#36 Wire						

CRYSTAL DIODES

ITEM No	ORIG.	MOTOROLA PART No	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
		REPLACEMENT DATA				
M4	1N60	48KT47548 *				Video Detector (Clip-in) * Selected component

MISCELLANEOUS

ITEM No	PART NAME	MOTOROLA PART No.	NOTES
M5	Tuner	11T51709	VHF (OPTT-12S) Ch. 7S-9S4
	Tuner	11T51709	VHF with UHF Provision (OPTT-12UY), Ch. 7S-9S4Y
	Tuner	11T51414	VHF (44TT-1T), Motorized version of OPTT-12S, Ch. WTS-564
	Tuner		UHF (TT-UU), Ch. 7S-9S4Y
M6	Thermostat Assy.	6CT49855	Includes Time Delay Resistor & Thermal Switch
M7	Magnet	48D737305	Plus cation correction (Not used on some models)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Mask, Picture Tube	13FT61413	Models 21C9CW, Y2C9CW, 27T9TBG, MG, Y2T9TBG, MG, 27T9BB, M, W, Y2T9BB, M, W
Mask, Picture Tube	13KT51907	Models A2C11B, M
Mask, Picture Tube	13KT51907	Models 21K23B, M, Y2K23B, M, W, 21K29B, M, W, Y2K29B, M, W, 21K27CW, Y2K27CW, 21K29B, M, MC, Y2K29B, M, MC, 21K30CW, Y2K30CW

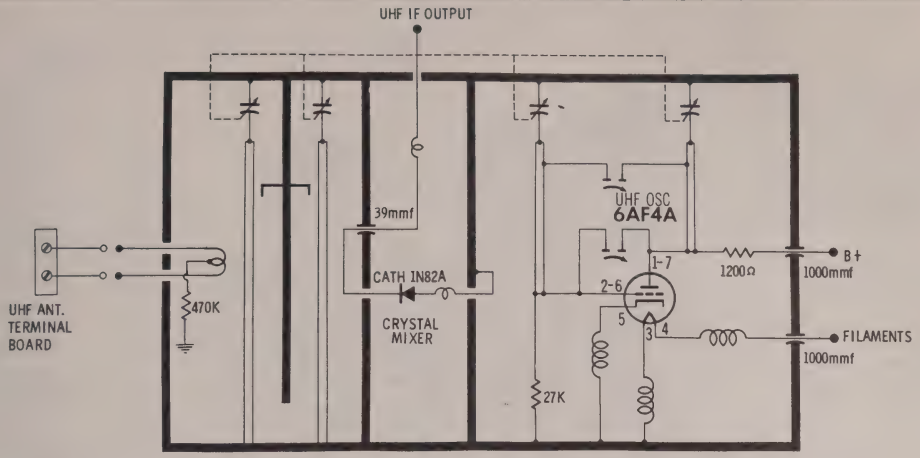
PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS (cont)

NAME	PART NO.	DESCRIPTION
Cabinet Leg	16K751588	Models 21C10CW, Y21C10CW
Cabinet Leg	16K747619	Models A21C11B, M (With Full Size Plate)
Cabinet Leg	16K747618	Models A21C11B, M (With Corner of Plate Cut off)
Cabinet Leg	16K745198	Models 21K129B, Y
Cabinet Leg	16K748617	Models 21K129M, Y
Cabinet Leg	16K746841	Models 21K129MC, Y
Cabinet Leg	16K749177	Models 21K130CW, Y21K130CW
Cabinet Leg	16K752490	Model A21K140B
Cabinet Leg	16K752489	Model A21K140M
Cabinet Leg	1K751676	(Includes Hanger Bolt & Glide), Model A21K141CW
Swivel Base Assy.	1K752015	(Includes Swivel & Legs) Models 21K126B, Y
Swivel Base Assy.	1K752013	(Includes Swivel & Legs) Models 21K126M, Y
Swivel Base Assy.	1K752014	(Includes Swivel & Legs) Models 21K126W, Y
Swivel Base Assy.	1K752121	(Includes Swivel, less legs) Model A21K139B
Swivel Base Assy.	1K752119	(Includes Swivel, less legs) Model A21K139M
Swivel Base Assy.	1K752120	(Includes Swivel, less legs) Model A21K139W
Swivel Base Assy.	1K751674	(Includes Swivel, Criss-Cross Arms & legs, Model A21K141CW
Mask, Picture Tube	BK751915	Models A21K138M, A21K139B, M, W, A21K140B, M, A21K141CW
Mask, Picture Tube	13F751413	Models 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W
Safety Glass	61C747252	Tinted, All models
Knob	1B751718	VHF Channel Selector, Models 21C10CW, Y21C10CW, 21K125B, M, Y21K125B, M, 21K126B, M, W, Y21K126B, M, W, 21K127CW, Y21K127CW, 21K129B, M, MC, Y21K129B, M, MC, 21K130CW, Y21K130CW, 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W
Knob	36B752870	Preset Channel Selector & Fine Tuning, Models A21C11B, M, A21K138M, A21K139B, M, W, A21K140B, M, A21K141CW
Knob	1V752909	Channel Selector (Pushbutton Assembly), Models A21C11B, M, A21K138M, A21K139B, M, W, A21K140B, M, A21K141CW
Knob	1V751931	Fine Tuning (Front) VHF Models 21C10CW, Y21C10CW, 21K125B, M, Y21K125B, M, 21K126B, M, W, Y21K126B, M, W, 21K127CW, Y21K127CW, 21K129B, M, MC, Y21K129B, M, MC, 21K130CW, Y21K130CW, 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W
Knob	36K751696	Fine Tuning (Rear), VHF Models 21C10CW, Y21C10CW, 21K125B, M, Y21K125B, M, 21K126B, M, W, Y21K126B, M, W, 21K127CW, Y21K127CW, 21K129B, M, MC, Y21K129B, M, MC, 21K130CW, Y21K130CW, 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W
Knob	1B751730	Fine Tuning, UHF Models 21C10CW, Y21C10CW, 21K125B, M, Y21K125B, M, 21K126B, M, W, Y21K126B, M, W, 21K127CW, 21K129B, M, MC, Y21K129B, M, MC, 21K130CW, Y21K130CW, 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W, Y21K127CW
Knob	1V751924	Off-On Volume, All Models
Knob	36B751755	Brightness, Vert. Hold, All Models
Knob	36K751697	Contrast, All Models
Knob	36K746089	Horiz. Hold, All Models
Knob	36B752588	Tone, Models 21C10CW, Y21C10CW, A21C11B, M, 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W
Knob	1V752229	Tone (Includes Bushing), All Models except 21C10CW, Y21C10CW, A21C11B, M, 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W
Dial Scale	34C751731	UHF, Models 21C10CW, Y21C10CW, 21K125B, M, Y21K125B, M, 21K126B, M, W, Y21K126B, M, W, 21K127CW, Y21K127CW, 21K129B, M, MC, Y21K129B, M, MC, 21K130CW, Y21K130CW, 21T67BG, MG, Y21T67BG, MG, 21T68B, M, W, Y21T68B, M, W
Cabinet	16E751587	Models 21C10CW, Y21C10CW
Cabinet	16K752218	Model A21C11B
Cabinet	16E752217	Model A21C11M
Cabinet	16K751683	Models 21K125B, Y
Cabinet	16E751682	Models 21K125M, Y
Cabinet	16K752012	Models 21K126B, Y
Cabinet	16E752010	Models 21K126M, Y
Cabinet	16K752011	Models 21K126W, Y
Cabinet	16E751687	Models 21K127CW, Y21K127CW
Cabinet	16K751678	Models 21K129B, Y
Cabinet	16E751677	Models 21K129M, Y
Cabinet	16K751679	Models 21K129MC, Y
Cabinet	16E751792	Models 21K130CW, Y21K130CW
Cabinet	16E752400	Model A21K138M
Cabinet	16K752118	Model A21K139B
Cabinet	16E752116	Model A21K139M
Cabinet	16K752117	Model A21K139W
Cabinet	16K752487	Model A21K140B
Cabinet	16E752486	Model A21K140M
Cabinet	16E751667	Model A21K141CW
Cabinet	16K751694	Models 21T67BG, Y
Cabinet	16K751693	Models 21T67MG, Y
Cabinet	16K751490	Models 21T68B, Y
Cabinet	16E751489	Models 21T68M, Y
Cabinet	16K751491	Models 21T68W, Y

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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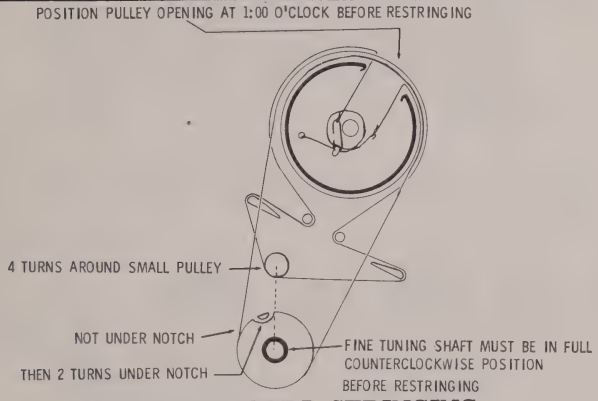
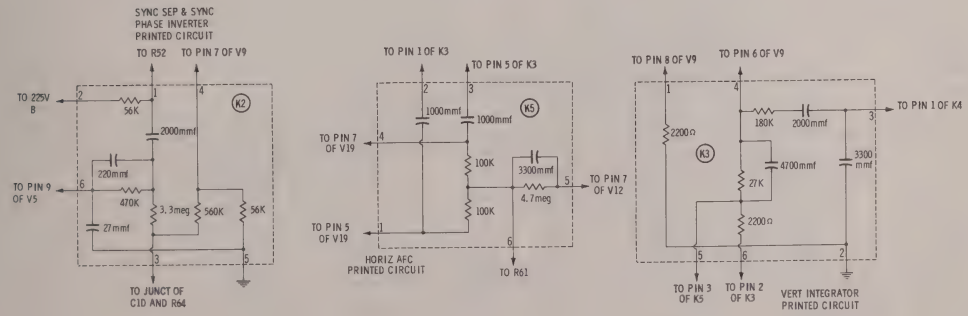
UHF TUNER TT-111


POSITION PULLEY OPENING AT 1:00 O'CLOCK BEFORE RESTRINGING
4 TURNS AROUND SMALL PULLEY
NOT UNDER NOTCH
THEN 2 TURNS UNDER NOTCH
FINE TUNING SHAFT MUST BE IN FULL
COUNTERCLOCKWISE POSITION
BEFORE RESTRINGING

UHF DRIVE CORD STRINGING



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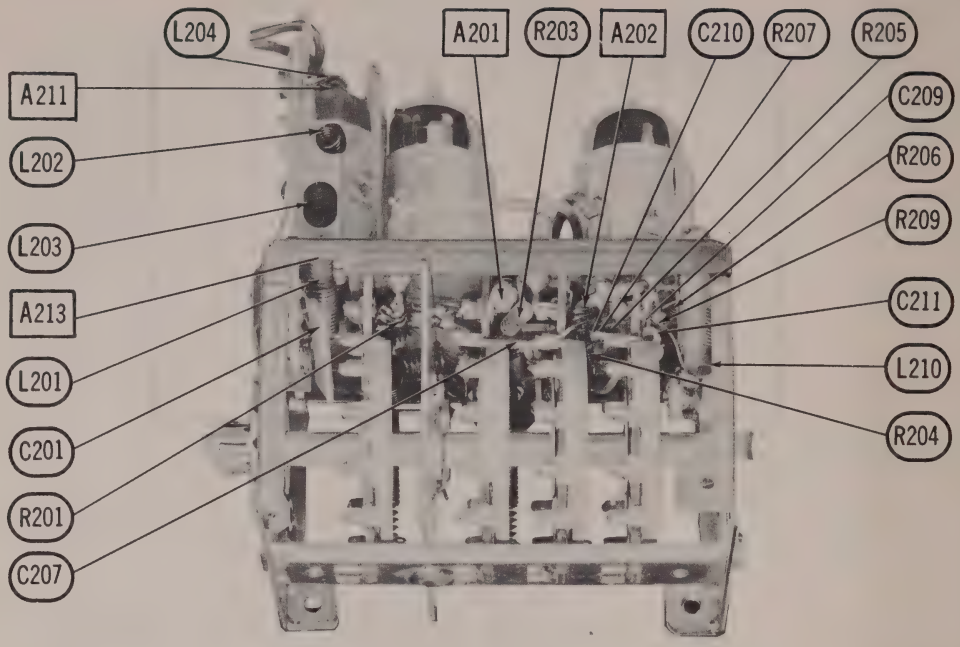
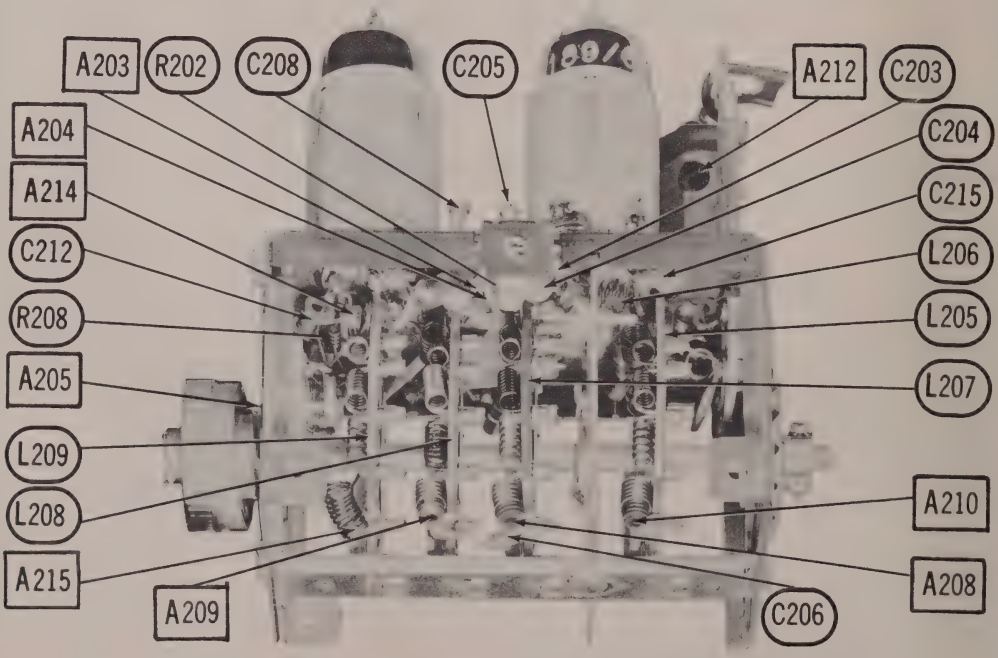
COMPONENT COMBINATION LAYOUT



TUNER 1U751700 (OPTT-123) - LEFT SIDE



TUNER 1U751700 (OPTT-123) - RIGHT SIDE

UHF IF ALIGNMENT

Remove the UHF Tuner from the side of the VHF Tuner so that UHF input receptacle of VHF Tuner is accessible. Coils are accessible thru opening in the side of tuner.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Fig. 203	High side thru matching network to UHF input receptacle. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	UHF	Vert. Amp. thru 47K to point ⓤ. Low side to chassis.	A216, A217	Adjust for maximum gain and symmetry of response similar to Fig. 204 with markers as shown.

FIG. 201

FIG. 202

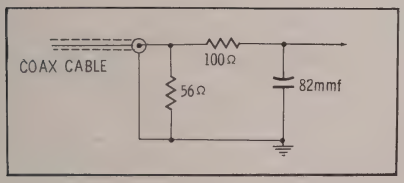
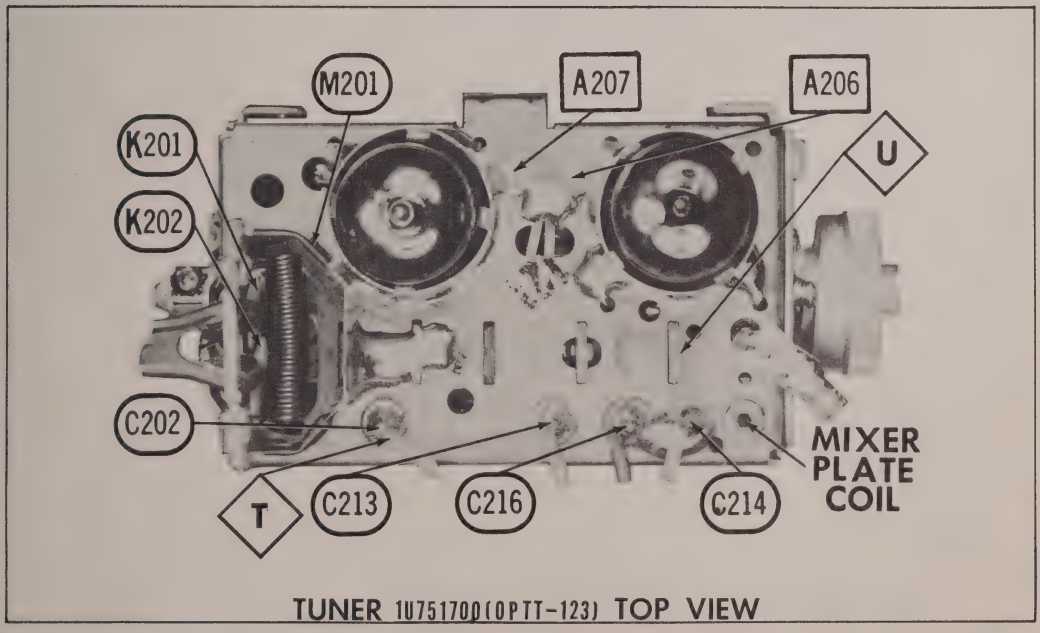


FIG. 203

FIG. 204



TUNER 1U751700(OPTT-123) TOP VIEW

TUNER PARTS LIST AND DESCRIPTIONS

1U751700(OPTT-123)

TUBES

CBS	GENERAL ELECTRIC	RAYTHEON	SYLVANIA

ITEM No.	USE	TYPE
V201	RF Amplifier	ECC189/6ES8

ITEM No.	USE	TYPE
V202	Mixer-Oscillator	6EU8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201A	27			TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
B	15	#51K751641		TCZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C	6.8			TCZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C202	1000		EF-001	MFT-1000		CCF-102	CT280A	
C203	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C204	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C205	.5-3			829-3		CV-1	CT565	
C206	1.5 10%		NPO-SI 1.5	TCZ-1R5	C10V15C		CNO-515	10TCC-V15
C207A	132			TCZ-130	L10T13			
B	15	#51K752032		TCZ-15	C10Q15C	CCTO-15	CNO-415	10TCC-Q15
C208	2-6			829.6		CV-3	CT552	
C209	3.9 10%	#21R128917			C10V4C			10TCC-V39
C210	680 10%		DI-680	DD-681		CCS-681	GP368	10TS-T68
C211	15 5%		NPO-SI 15	TCZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C212	5.6 N5250 5%	#21K749376				*		
C213	1000		EF-001	MFT-1000		CCF-102	CT280A	
C214	1000		EF-001	MFT-1000		CCF-102	CT280A	
C215	680 10%		DI-680	DD-681		CCS-681	GP368	10TS-T68
C216	1000		EF-001	MFT-1000		CCF-102	CT280A	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
\# Motorola Part Number.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	47K	
R202	1meg	
R203	330Ω	

ITEM No.	RATING	REMARKS
R204	15K	
R205	100K	
R206	33K	

ITEM No.	RATING	REMARKS
R207	47K	
R208	15K	
R209	2200Ω	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K201	40MC Filter	10mmf, 22mmf, 470K	51C747535	
K202	40MC Filter	10mmf, 22mmf, 470K	51C747535	

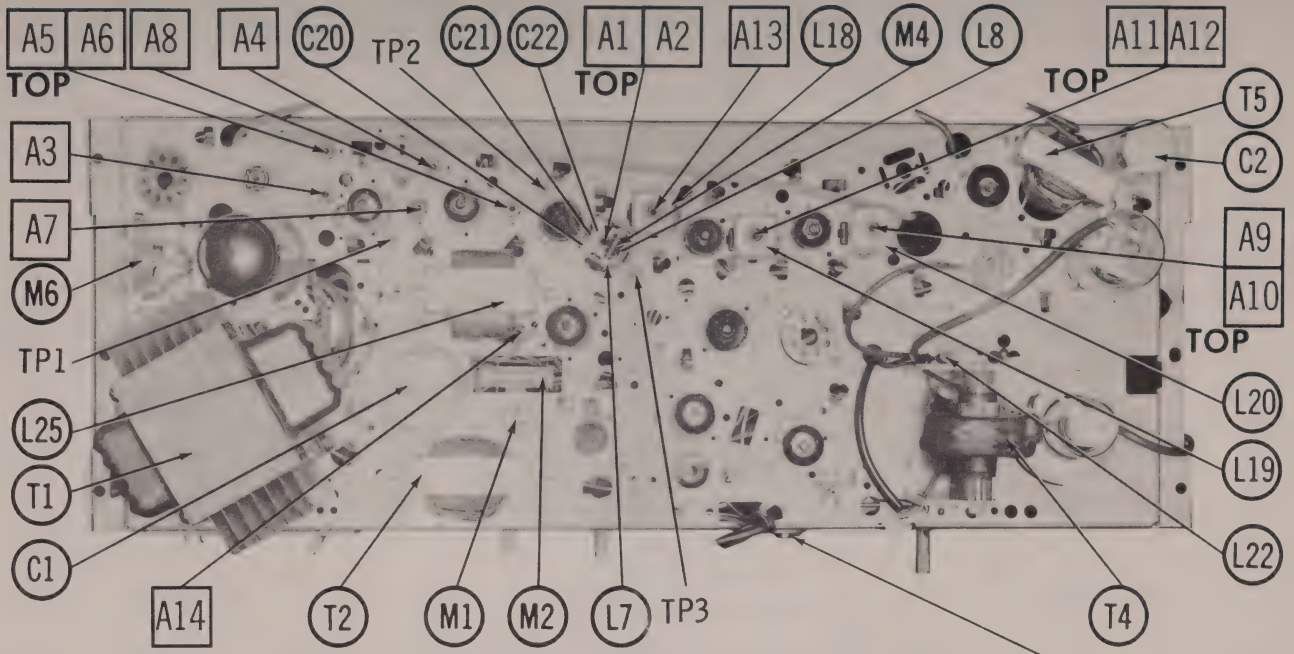
COILS (RF-IF)

ITEM No.	USE	MOTOROLA PART No.	NOTES
L201	IF Trap Coil	24K751655 †	† Part of M201.
L202	IF Trap Coil	24K751655 †	
L203	Ant. Trans.	24B749398 †	
L204	FM Trap Coil	24K752270 †	
L205	Ant. Coils	1V752397	Channels 2-13 Includes Wafer Assy.
L206	RF Choke	24K752261	

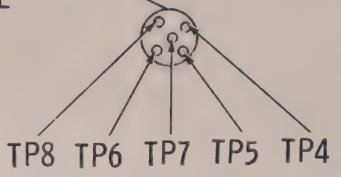
ITEM No.	USE	MOTOROLA PART No.	NOTES
L207	RF Coils	1V751663	Channels 2-13 Includes Wafer Assy.
L208	Mixer Grid Coils	1V751662	Channel 2-13 Includes Wafer Assy.
L209	Osc. Coils	1V748991	Channel 2-13 Includes Wafer Assy.
L210	Mixer Plate Coil	24B747838	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M201	Hi Pass Filter	1V751664	Assembly
	Shaft	1B752100	Fine Tuning, Includes Driver Gear
	Shaft	47K752075	VHF Channel Selector
	Idler Gears & Shaft	1A752394	Assembly



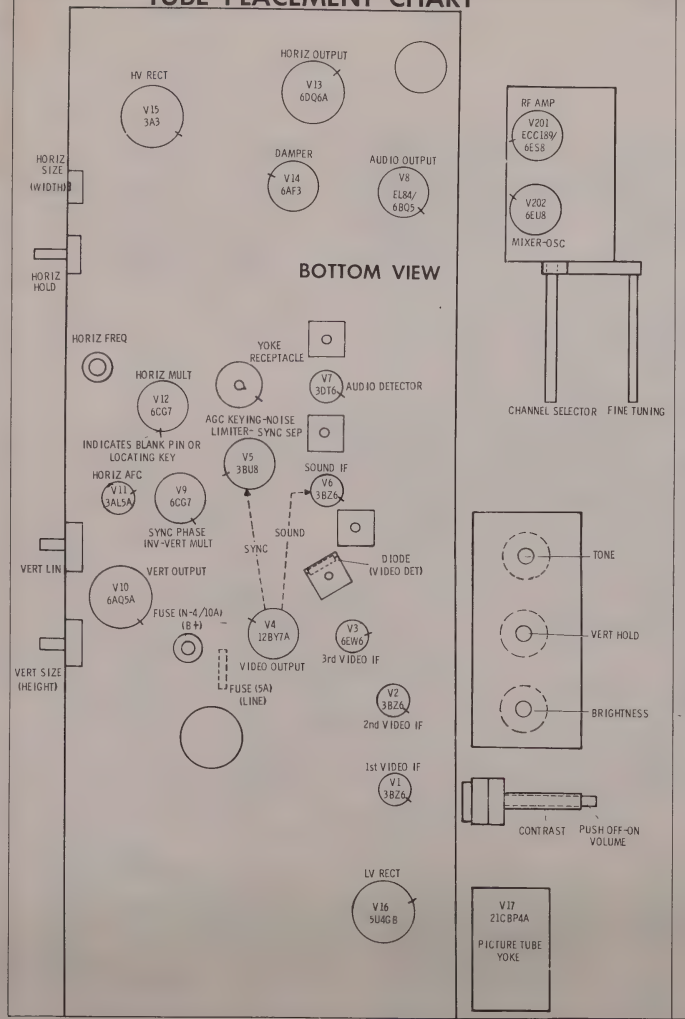
TP1	125V	1st Video IF Screen	TP5	205V	HORIZ OSC PLATE
TP2	0V	3rd Video IF Grid	TP6	0V	GROUND
TP3	-.67V	VIDEO AMP GRID	TP7	225V	FUSED B+
TP4	-.35V	IF AGC	TP8	-.4V	HORIZ AFC



CHASSIS - TOP VIEW

MOTOROLA CHASSIS
TS-564, TS-564Y, WTS-564

TUBE PLACEMENT CHART



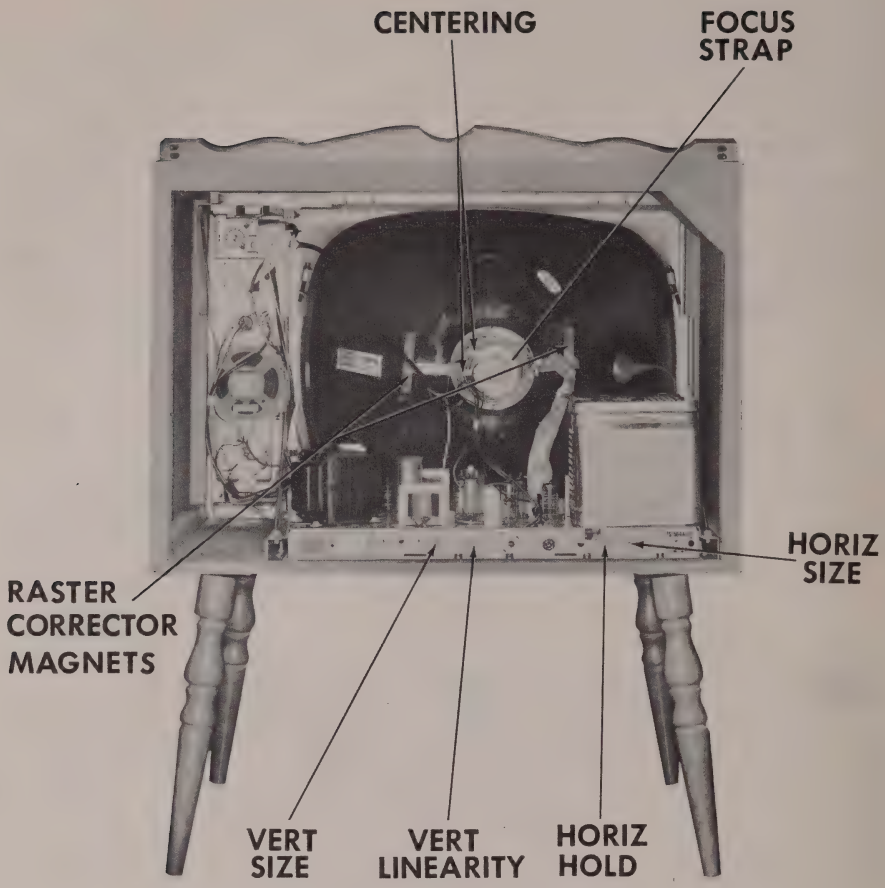
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	680K	47Ω	.1Ω	.5Ω	†8200Ω	†8200Ω	0Ω		
V2	3BZ6	680K	47Ω	.5Ω	0Ω	†8200Ω	†8200Ω	0Ω		
V3	6EW6	1000Ω	120Ω	.1Ω	0Ω	†8200Ω	†47K	0Ω		
V4	12BY7A	• 20Ω	72K	0Ω	.1Ω	.1Ω	0Ω	†5600Ω	†11K	0Ω
V5	3BU8	†3900Ω	†47K	2.3meg	.1Ω	.9Ω	†40K	†870K	†2.5meg	†3.8meg
V6	3BZ6	100K	0Ω	.1Ω	.5Ω	†12K	†57K	0Ω		
V7	3DT6	3.3Ω	560Ω	.1Ω	0Ω	†390K	†11K	560K		
V8	EL84/ 6BQ5	0Ω	0Ω	180Ω	.1Ω	0Ω	NC	†1000Ω	NC	†470Ω
V9	6CG7	• †1.7meg	• 1.6meg	0Ω	0Ω	.1Ω	†34K	56K	2200Ω	0Ω
V10	6AQ5A	• 1.3meg	0Ω	0Ω	.1Ω	†625Ω	†175Ω	• 1.3meg		
V11	3AL5A	12Ω	12Ω	.9Ω	0Ω	4.8meg	0Ω	4.8meg		
V12	6CG7	†60K	• 80K	1000Ω	0Ω	.1Ω	†12K	9.4meg	1000Ω	NC
V13	6DQ6A	TP	0Ω	NC	• †7300Ω	1meg	NC	.1Ω	12Ω	TOP CAP †11.9Ω
V14	6AF3	NC	†2.5Ω	NC	0Ω	.1Ω	NC	TP	NC	†2.5Ω
V15	3A3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †262Ω
V16	5U4GB	TP	¶	TP	26Ω	NC	24Ω	NC	¶	
V17	21CBP4A	0Ω	100K	Pin 6 0Ω	Pin 10 †360K	Pin 11 • 280K	Pin 12 .1Ω			
V201	ECC189/ 6ES8	†5900Ω	500K	INF	0Ω	.1Ω	INF	370K	0Ω	0Ω
V202	6EU8	†8200Ω	15K	†2200Ω	0Ω	.1Ω	0Ω	100K	0Ω	†55K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

TOP CAP ¶6meg

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM CAP. LEAD OF V14.
† MEASURED FROM 235V SOURCE.

NC NO CONNECTION
TP TIE POINT



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the Brightness and Contrast controls for a normal picture.

Short out the AFC voltage by connecting a clip lead from TP-8 to chassis. Connect a .1mfd, 400 volt capacitor from TP-5 to chassis.

Adjust Horizontal Hold to the point where the picture is almost stable horizontally.

Remove the capacitor from TP-5 and adjust the Horizontal Frequency slug (B1) to the point where the picture is almost stable horizontally.

Remove the clip lead from TP-8 and chassis. Adjust the Horizontal Hold control until the picture is synchronized horizontally.

Adjust the Horizontal Size (R8) for a picture slightly wider than necessary to fill the picture mask horizontally.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL FOR MODEL 21C10CW

1. Remove 1 push-on type knob from the rear of the cabinet. Remove 1 metal and 7 wood screws holding rear cover. Remove antenna lead. Remove rear cover.
2. Remove front control lead plug, tuner lead plugs, yoke plug, HV lead, picture tube socket, and speaker leads.
3. Remove 4 chassis bolts holding chassis to metal framework.
4. Remove chassis.
5. Remove 4 push-on type knobs from the front of cabinet.
6. Turn the vertical hold and Brightness control bracket 1/4 turn counterclockwise from the rear of the cabinet.
7. Remove 3 metal screws holding the front control bracket.
8. Remove front control bracket.

PICTURE TUBE REMOVAL

1. Remove chassis.
2. Remove 4 bolts holding picture tube mounting bracket to cabinet.
3. Remove picture tube and mounting bracket.
4. Loosen 2 picture tube mounting strap bolts.
5. Remove picture tube.

PHOTOFACT® Folder with CIRCUITRACE®

SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665

SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665

MODEL 106DS (Ch. 528.51660)

SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665

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SET 481 FOLDER 2

SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665

MODEL 106DS (Ch. 528.51660)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME	Silvertone	MODEL	CHASSIS
		PC-106AQ, PC-106DS, PC-106GY, PC-118B	456.51660
			456.51662
			456.51664
		PC-106-5AQ, PC-106-5DS, PC-106-5GY, PC-11B-5	456.51661
			456.51663
			456.51665
		106AQ, 106DS, 106GY, 118B	528.51660
			528.51662
			528.51664
		106-5AQ, 106-5DS, 106-5GY, 118B-5	528.51661
			528.51663
			528.51665

SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Avenue, Chicago, Illinois
TYPE SET	Television Receiver
TUBES	VHF-Sixteen, UHF-Seventeen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 135 Watts, 1.4 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 5 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

FUSE DEVICE

A Circuit Breaker is used for low voltage power supply protection, and may be reset by depressing the reset button. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF oscillator, remove channel selector, fine tuning knobs, and vinyl insert.

AGC

The AGC may be varied by means of an AGC Control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by connecting the lead from pin 4 of the picture tube to various voltage points. (For location, see photo "Cabinet-Rear View".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by adjusting a metallic sleeve, located between the yoke and the picture tube neck, in or out of the yoke. (May not be used on some models)

HORIZONTAL DRIVE

The horizontal drive may be varied by a Horizontal Drive Control. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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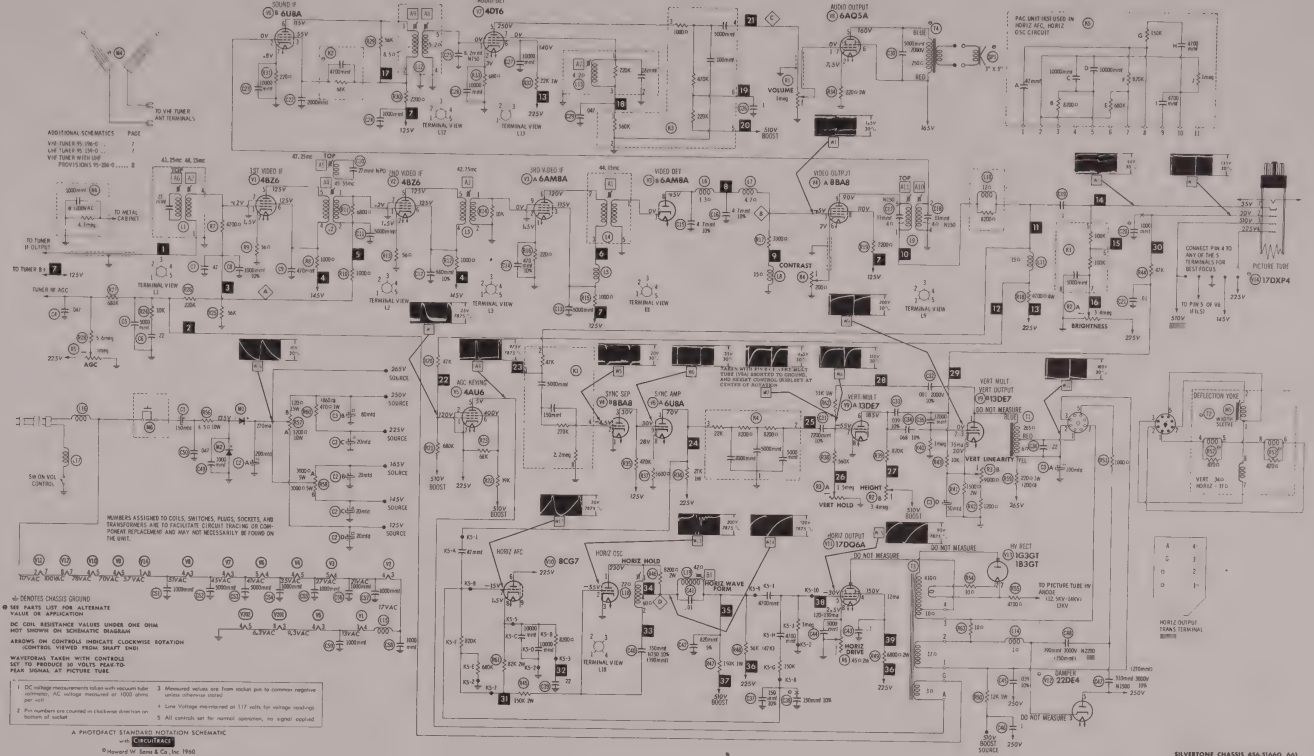
JA845

DATE 4-60 SET 481 FOLDER 2

SET 481 FOLDER 2


SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665
SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665
FOLDER 2
PAGE 2
PAGE 19
SOUND IF V10 6U8A
AUDIO DET V7 4DT6
AUDIO OUTPUT V8 6AQ5A
VOLUME
PAC UNIT (ASS'D USED IN HORIZ AFC, HORIZ OSC CIRCUIT)
ADDITIONAL SCHEMATICS PAGE
V-H TUNER 95-196-0 7
U-H TUNER 95-199-0 7
V-H TUNER WITH UHF PROVISIONS 95-204-0 8
TO V-H-F TUNER ANT TERMINALS
TO UHF TUNER ANT TERMINALS
1ST VIDEO IF V1 4BZ6
2ND VIDEO IF V2 4BZ6
3RD VIDEO IF V10 6AM8A
VIDEO DET V9 6AM8A
VIDEO OUTPUT V8 A 6BA8
CONTRAST
BRIGHTNESS
PICTURE TUBE V16 17DXP4
CONNECT PIN 4 TO ANY OF THE 5 TERMINALS FOR BEST FOCUS
TO PIN 5 OF V6 IF 4LS1
TO TUNER IF OUTPUT
TO TUNER B+
TUNER RF AGC
AGC
TERMINAL VIEW L1
TERMINAL VIEW L2
TERMINAL VIEW L3
TERMINAL VIEW L4
TERMINAL VIEW L5
TERMINAL VIEW L6
TERMINAL VIEW L7
TERMINAL VIEW L8
TERMINAL VIEW L9
TERMINAL VIEW L10
TERMINAL VIEW L11
TERMINAL VIEW L12
TERMINAL VIEW L13
TERMINAL VIEW L14
TERMINAL VIEW L15
TERMINAL VIEW L16
TERMINAL VIEW L17
TERMINAL VIEW L18
TERMINAL VIEW L19
TERMINAL VIEW L20
TERMINAL VIEW L21
TERMINAL VIEW L22
TERMINAL VIEW L23
TERMINAL VIEW L24
TERMINAL VIEW L25
TERMINAL VIEW L26
TERMINAL VIEW L27
TERMINAL VIEW L28
TERMINAL VIEW L29
TERMINAL VIEW L30
TERMINAL VIEW L31
TERMINAL VIEW L32
TERMINAL VIEW L33
TERMINAL VIEW L34
TERMINAL VIEW L35
TERMINAL VIEW L36
TERMINAL VIEW L37
TERMINAL VIEW L38
TERMINAL VIEW L39
50 CPS VOL CONTROL
AUX. KEYING
SYNC SEP V9 6BA8
SYNC AMP V8 6U8A
VERT MULT V9 13DE7
VERT OUTPUT V8 13DE7
VERT LINEARITY
VERT HOLD
HEIGHT
DEFLECTION YOKE
VERT. SAW HORIZ. SYNC
HORIZ AFC
HORIZ OSC V3 6CG7
HORIZ HOLD
HORIZ WAVE FORM
HORIZ OUTPUT V17 DQ6A
HORIZ DRIVE
HV RECT 1G3GT 1B3GT
TO PICTURE TUBE HV ANODE
DAMPER 22DE4
HORIZ OUTPUT FRONT TERMINAL
DO NOT MEASURE
365V SOURCE
250V SOURCE
225V SOURCE
165V SOURCE
145V SOURCE
125V SOURCE
310V BOOST
275V BOOST
510V BOOST
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
DENOTES CHASSIS GROUND
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt.
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated.
4 Line Voltage maintained at 117 volts for voltage readings.
5 All controls set for normal operation, no signal applied
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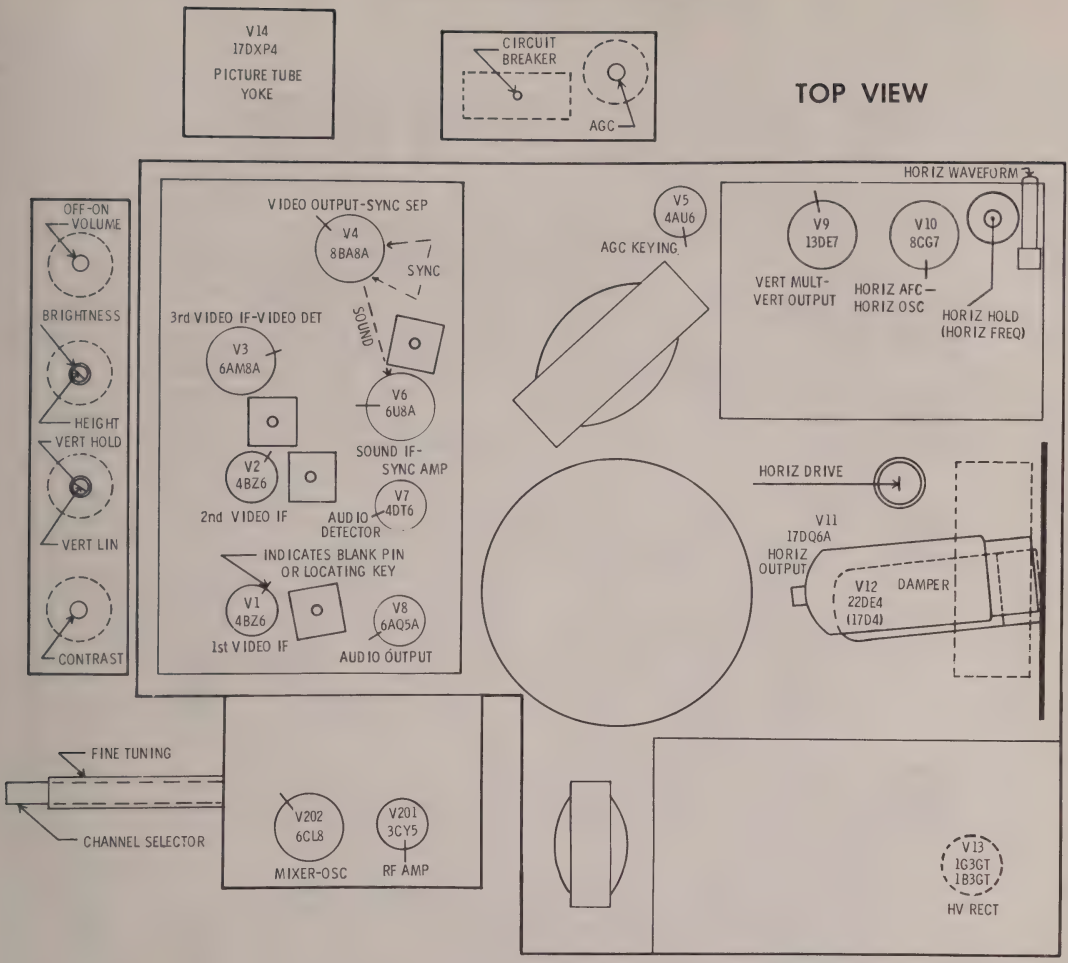
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

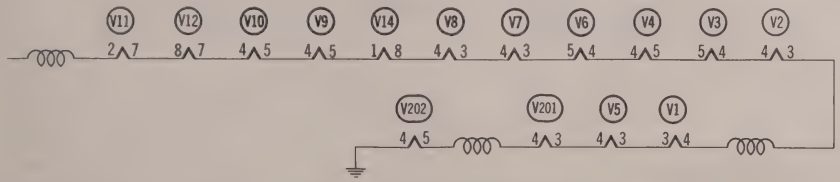
POWER SUPPLY FAILURE
No raster, no sound Circuit Breaker, Rectifiers (B+)

SWEEP FAILURE
No raster, has sound V10, V11, V12, V13, V14
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, Rectifiers (B+)
Vert. off freq. V9
Horiz. off freq. V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V6, V7, V8
Overloaded picture V5

SYNC FAILURE
No vert. sync V4, V6
No horiz. sync V4, V6
No vert. or horiz. sync V4, V6

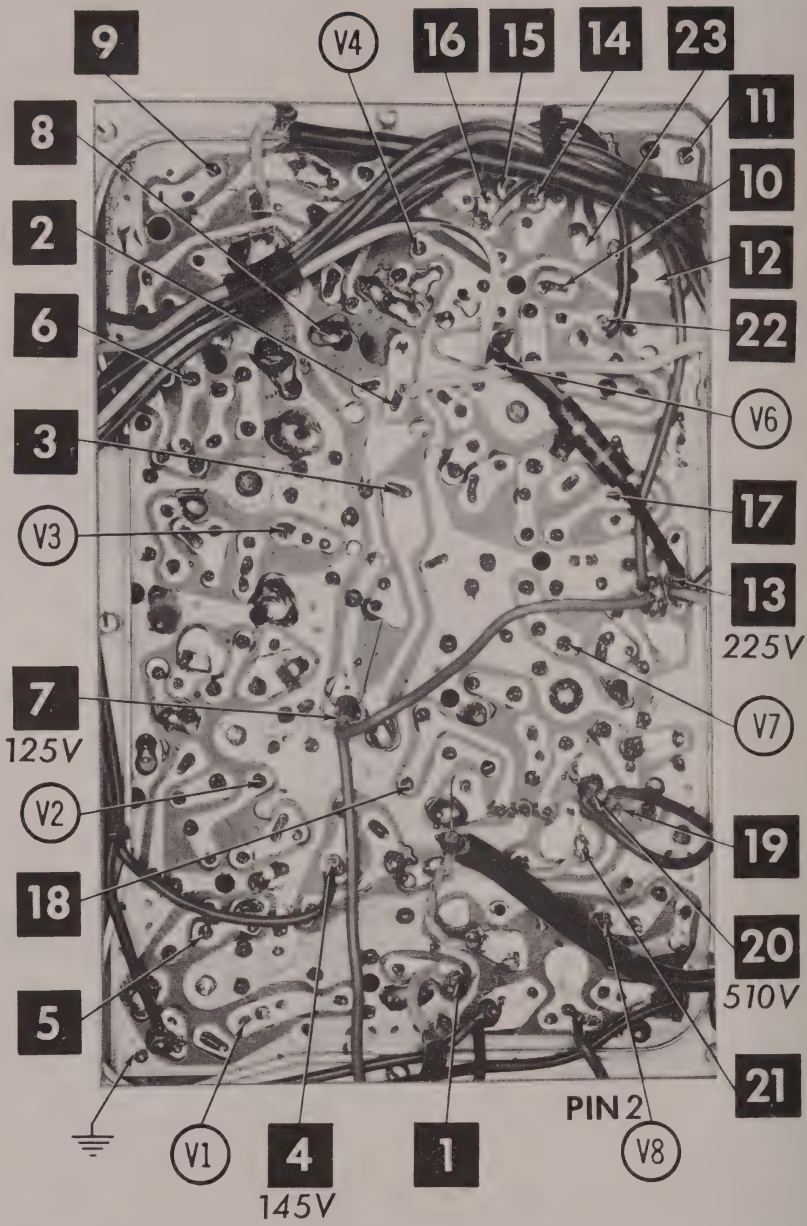
This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665

FOLDER 2

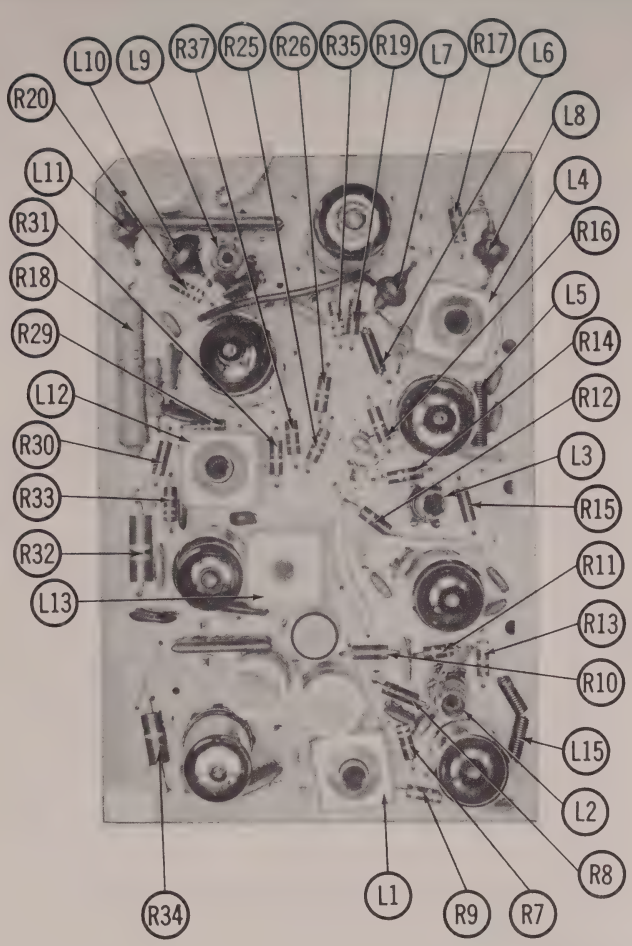
CircuiTrace Numbers 1 thru 23

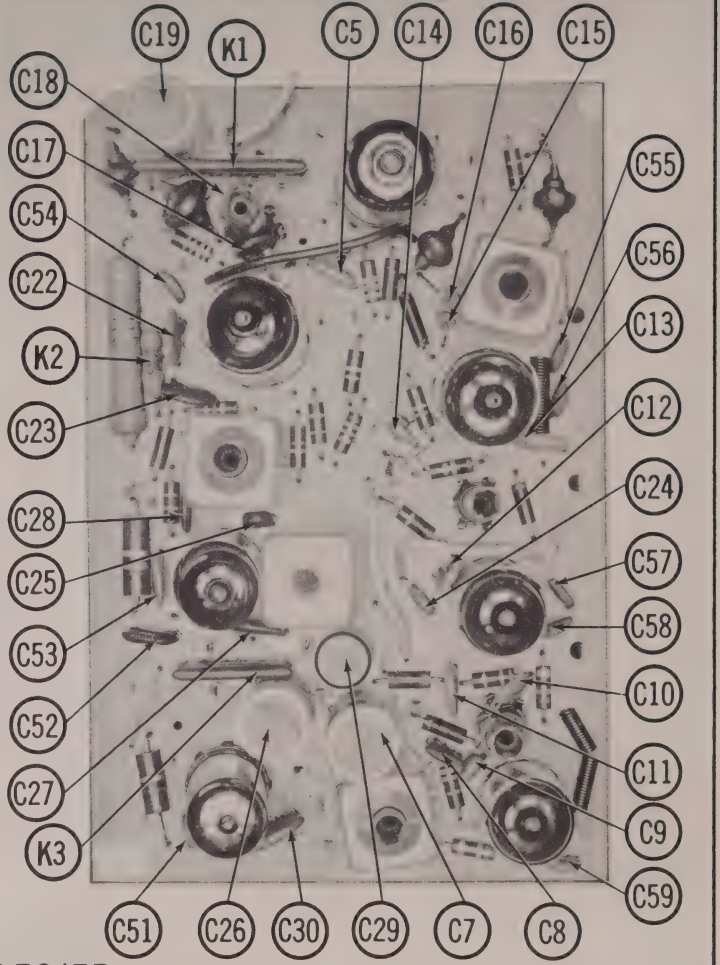


A Howard W. Sams CIRCUITRACE® Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

MAIN PRINTED BOARD





MAIN PRINTED BOARD

RESISTOR AND INDUCTOR IDENT.

CAPACITOR AND MISC. IDENT.

SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Short the antenna terminals together, but not to chassis.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Detune A1, A4, A5, A6, and Mixer Plate Coil by turning the cores almost out of the coil forms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.15MC (Unmod)	Any non-interfering channel	DC probe thru 10K to point (B). Common to chassis. (Across Video Det. load)	A1, A2, & Mixer Plate Coil	Attenuate generator output to maintain not more than 2 volts on VTVM. Adjust for maximum deflection.
2.	"	"	42.75MC	"	"	A3	"
3.	"	"	45.55MC	"	"	A4	"
4.	"	"	47.25MC	"	"	A5	Increase generator output. Adjust A5 for MINIMUM deflection. Repeat steps 3 and 4.
5.	"	"	41.25MC	"	"	A6	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Short the antenna terminals together, but not to chassis.
Attenuate sweep generator output to maintain not more than 2 volts peak to peak on scope.
If separate marker generator is used, couple loosely to output cable of sweep generator.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.25MC (10MC Swp)	41.25MC 42.55MC 43.8MC 44.15MC 45.0MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point (B). Low side to chassis.		Check for response similar to Fig. 1. If necessary, retouch Mixer Plate Coil to place 45.75MC marker at 50%. Retouch A1 for proper tilt.

SOUND IF ALIGNMENT

Connect the negative lead of a 5 volt bias supply to point (A). Positive to chassis.
Set Contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.05mfd	High side to point (B). Low side to chassis. (.1 volt output)	4.5MC (400% FM 15KC Swp)	Any non-interfering channel	AC probe to point (C). Common to chassis.	A7, A8	Adjust for maximum deflection. If two peaks are found, use the greater peak.
2.	"	High side to point (B). Low side to chassis. (500 microvolts)	"	"	"	A9, A10	Adjust for maximum deflection. Retouch A8 for maximum deflection.

4.5MC TRAP ALIGNMENT

Tune in a TV signal and adjust the Fine Tuning until a 4.5MC beat interference is noted in the picture. Adjust A11 until the horizontal scanning lines are smooth and continuous.

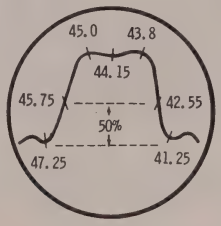
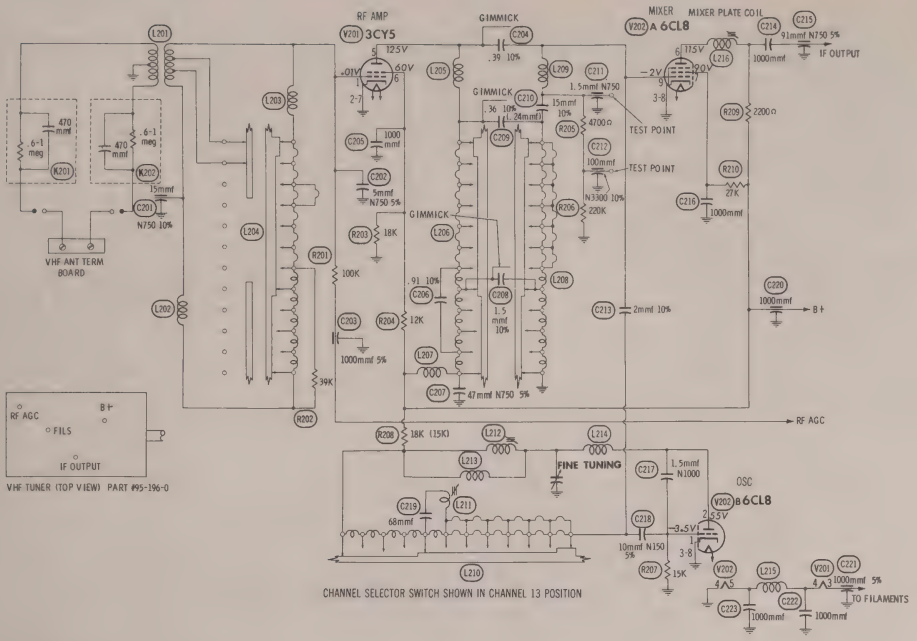


FIG.1



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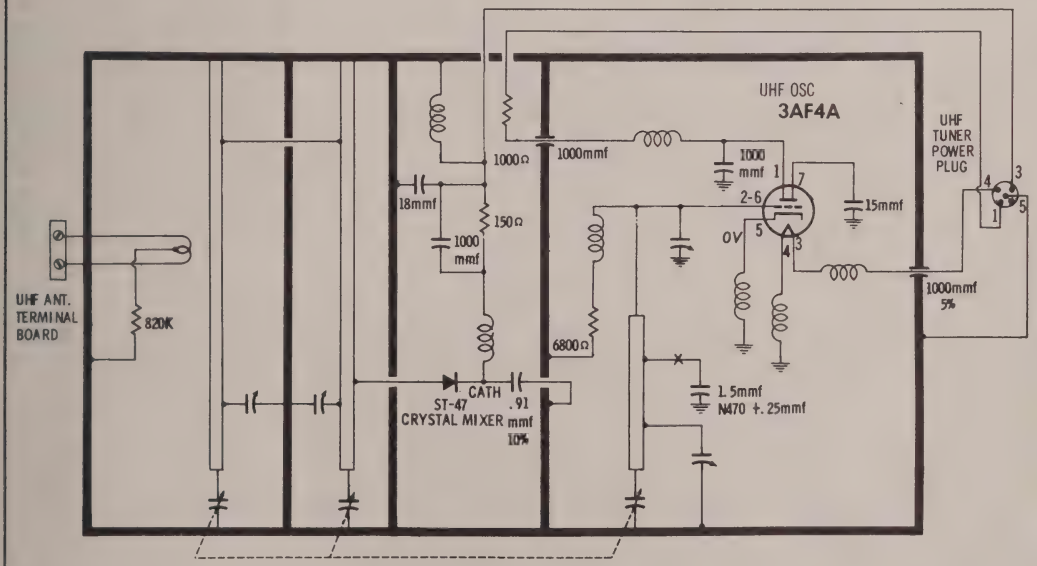
VHF TUNER 95-196-0



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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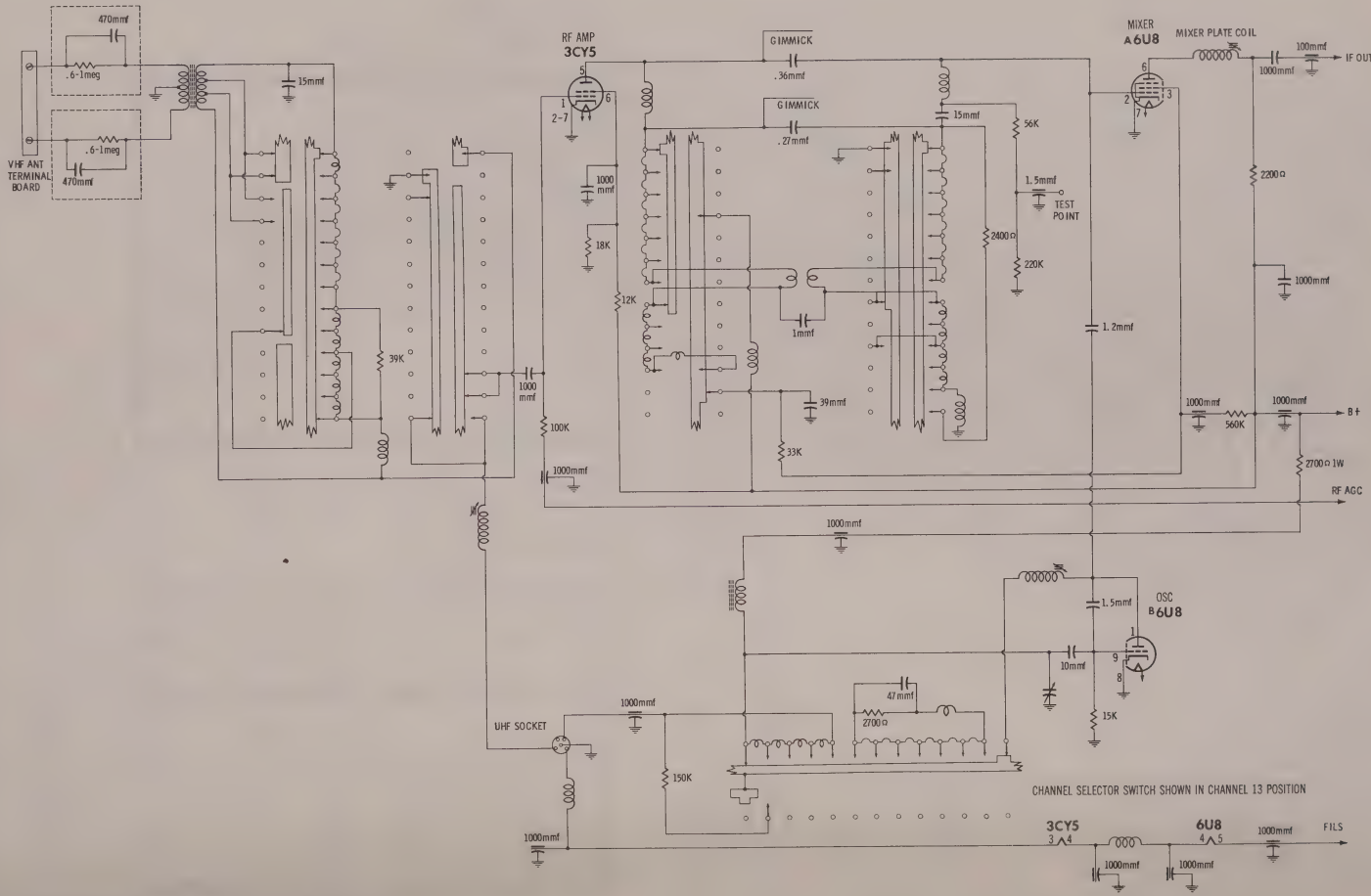
UHF TUNER 95-159-0



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VHF TUNER with UHF Provisions 95-204-0

TUNER PARTS LIST AND DESCRIPTIONS

95-196-0

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	3CY5	V202	Mixer-Osc.	6CL8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	15 N750 10%	#258-150						
C202	5 N750 5%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C203	1000 5%		EF-001	MFT-1000		CCF-102	CT280A	
C204	.39 10%	#2101-398						
C205	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C206	.91 10%	#2101-918						
C207	47 N750 5%		NPO-DI 47	DTZ-47	C10Q47U	CCTN-47	CN7-447	10TCU-Q47
C208	1.5 10%		NPO-SI 1.5	TCZ-1R5	C10V15C		CNO-515	10TCC-V15
C209	.36 10%	(.24mmf)**						
C210	15 10%		NPO-DI 15	DD-150	L10T15	CCD-100	GP415	10TS-Q15
C211	1.5 N750	#259-159						
C212	100 N3300 10%	#252-101						
C213	2 10%			TCZ-2R2	C10V2C	CCTO-2R2	CNO-552	10TCC-V22
C214	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C215	91 N750 5%	#253-910						
C216	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C217	1.5 N1000	#171-159						
C218	10 N150 5%	#165-100				*		10TCP-Q10
C219	68	Note 1	DI-68	DD-680	L10Q68	CCD-680	GP468	10TS-Q68
C220	1000		EF-001	MFT-1000		CCF-102	CT280A	
C221	1000 5%		EF-001	MFT-1000		CCF-102	CT280A	
C222	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C223	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
Note 1. Not used in some versions. # Silvertone Part No. ** Alternate value (Part #2101-248).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	100K	
R202	39K	
R203	18K	
R204	12K	

ITEM No.	RATING	REMARKS
R205	4700Ω	
R206	220K	
R207	15K	
R208	18K	(15K) *

ITEM No.	RATING	REMARKS
R209	2200Ω	
R210	27K	

* Alternate value.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA	
K201	Antenna Isolation	470mmf, .6-1meg	330-1	Centralab Sprague	RC-471 AC1-1
K202	Antenna Isolation	470mmf, .6-1meg	330-1	Centralab Sprague	RC-471 AC1-1

COILS (RF-IF)

ITEM No.	USE	SILVERTONE PART No.	NOTES
L201	Ant. Trans.	2309-5	
L202	RF Choke	310-5	
L203	RF Choke	310-5	
L204	Ant. Coils	2800-504	Channel 2-13, Includes Wafer Assy.
L205	RF Choke	363-7	
L206	RF Coils	2801-503	Channel 2-13, Includes Wafer Assy.
L207	RF Choke	301-25	
L208	Mixer Grid Coils	2802-501	Channel 2-13, Includes Wafer Assy.

ITEM No.	USE	SILVERTONE PART No.	NOTES
L209	RF Choke	362-7	
L210	Osc. Coils	2803-501	Channel 2-13 Includes Wafer Assy.
L211	Low Band Osc. Coil	5381-14	
L212	Hi Band Osc. Coil	5381-13	
L213	RF Choke	310-8	
L214	RF Choke	1740-1	
L215	Fil. Choke	300-20	
L216	Mixer Plate Coil	2110-9	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
	Fine Tuning Shaft	2264-44	

SILVERTONE CHASSIS 456.51660, 661, 662, 663, 664, 665, 528.51660, 661, 662, 663, 664, 665

FOLDER 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	CBS	GENERAL ELECTRIC	RAYTHEON	SYLVANIA	USE
V1		4BZ6			1st Video IF Amp.
V2		4BZ6			2nd Video IF Amp.
V3					3rd Video IF Amp.
V4		6AM8A			Video: Det
V5		6BA8A			Video Output-Sync Sep.
V6		4AU6			AGC Keying
V7		6U8A			Sound IF Amp. -Sync Amp.

* Alternate. Manufacturer recommends 21DE4 replacement.

ITEM No.	USE	TYPE
V7	Audio Detector	4GT8
V8	Audio Output	6AQ8A
V9	Vert. Multi. - Vert. Output	13DE7
V10	Horiz. AFC-Horiz. Osc.	8CG7
V11	Horiz. Output	17DQ6A
V12	Damper	21DE4 (17D4)*
V13	HV Rect.	1G3GT 1B3GT

PICTURE TUBE

ITEM No.	REPLACEMENT DATA					NOTES
	SILVERTONE PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
V14	17QX24 21DHP4			17QX24 ①		① "Silver Screen 65"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					
	CAP	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	P/RAMID PART No.	SPRAGUE PART No.
C1	150	160	PRL-100	PRL-100	BR1505	TC4M8	TD-150-450	TVA-4420
C3A	±300	330	AFH-03-90	10038		FP415.54	TM5-128	TVL-4590
B	20	300						
C	±30	300						
E	±20	300						
C3A	±100	300	18-RL-8	D0474	rF2346.12			TVLB-4573.5*
B	±60	300		BR3035	TCE0			
C	±30	300						
D	50	50						

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating columns are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	.047 300V		P38N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C5	5000		BPD-005	DD-502	BYA1D05	CCD-502	GP350	5HK-D50
C6	.22 200V		P38N-22		CUB2P22	3DP-6-224	GEM-3122	2TM-P22
C7	.47 150V		P38N-47		BC5P47U	3DP-5-474	GEM-3047	2HE-P47
C8	1000 10%		DI-1000	DD-103	BR1D1	CCD-103	GP301	10TS-D10
C9	470		BPD-00047	DD-471	BYA1D47	CCD-471	GP347	10TS-D47
C10	27 NPO		NPO-.03 3S	TCE-27	CUW2TC	CCT0-270	CNO-427	10TCC-427
C11	5000		BPD-005	DD-502	BYA1D05	CCD-502	GP350	5HK-D50
C12	500 10%		DI-500	DD-501	BR5T05	CCD-501	GP349	10TS-T50
C13	5000		BPD-005	DD-502	BYA1D05	CCD-502	GP350	5HK-D50
C14	470 10%		DI-470	DD-471	BR5T47	CCD-471	GP347	10TS-T47
C15	4.7 10%		NPO-.5 4.7	TCE-4R7	CU0Y4TC	CCT0-4R7	CNO-547	10TCC-Y47
C16	4.7 10%		NPO-.5 4.7	TCE-4R7	CU0Y4TC	CCT0-4R7	CNO-547	10TCC-Y47
C17	33 N150					"		10TCP-Q33
C18	33 N150					"		10TCP-Q33
C19	.1 400V		P4B1N-1	DF-104	BC5P1J	4DP-3-104	ACE401	6TM-P1
C20	1000	Note 1	BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C21	.01 200V		P2B1N-01	DM-103	BC5B2J	4DP-1-103	ACE201	6TM-S1
C22	3000		BPD-003	DD-302	BYA1D3	CCD-302	GP320	5HK-D30
C23	10000		BPD-01	DD-103	BYA1D1	CCD-103	GP310	5HK-D10
C24	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C25	8.2 N750							
C26	.1 600V		P4B1N-1	DF-104	BC5P1J	6DP-4-104	ACE601	6TM-P1
C27	10000		BPD-01	DD-103	BYA1D1	CCD-103	GP310	5HK-D10
C28	10000		BPD-01	DD-103	BYA1D1	CCD-103	GP310	5HK-D10
C29	.047 400V		P4B1N-047	DD-503	BC5S47	4DP-3-473	ACE407	6TM-S47
C30	5000 2000V			DD30-502	SVC3D05	SCCD-502	2EV-247	
C31	1200 10%		DI-1200		BR2D12	PMED22	GP323	10TB-D22
C32	.001 3000V 10%							
C33	.039 400V 10%		V84C6S4-10%		PM6S4	8DP-3-393		2WF-S39
C34	.068 400V 10%		V84C6S68-10%		PM6S68	8DP-3-683		6TM-S68
C35	12000	#30-306-0						
C36	.22 300V		P2B5N-22		CU2P22	3DP-6-224	GEM-2022	2TM-P22
C37	150 10%		1469-00015		12R5T15	CM-20B-151K	MCB2S5	MS-315
C38	150 10%	Note 1	1469-00015		12R5T15	CM-20B-151K	MCB2S5	MS-315
C39	.22 300V		P2E1N-22		BC5P22J	3DP-5-224	GEM-2022	2TM-P22
C40	350 N750 10%	(390mmf) †	N750-DS 39D	TCN-380				10TCU-T39
C41	.01 500V		P5B5N-01	DM-103	CUB5S	8DP-3-103	GEM-511	6TM-S1
C42	820 5%		1469-00082		BR2T82	CM-30B-821J	MCB2S2	MS-382
C43	.1 400V		P4B5N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	6TM-P1
C44	5000		BPD-005	DD-502	BYA1D05	CCD-502	GP350	5HK-D50
C45	.039 400V 10%		P5B4CM-039		PM6S4	8DP-3-393		6TM-S4
C46	.1 400V		P4B5N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	6TM-P1
C47	310 300V N1500 10%	(270mmf) †						10uh
C48	330 300V N2200 10%	(350mmf) †						60uh
C49	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C50	.047 400V		P4B1N-047	DD-503	BC5S47	4DP-3-473	ACE407	6TM-S47
C51	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C52	5000		BPD-005	DD-502	BYA1D05	CCD-502	GP350	5HK-D50
C53	5000		BPD-005	DD-502	BYA1D05	CCD-502	GP350	5HK-D50
C54	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C55	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C56	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C57	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C58	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10
C59	1000		BPD-001	DD-102	BYA1D1	CCD-102	GP310	5HK-D10

Note 1. Not used in some versions. † Alternate value. #Silverione Part Number
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING	WATTS	REPLACEMENT DATA					INSTALLATION NOTES
			SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	24-316-0	B-70-8	A47-1meg-Z	Q15-107	U53	Volume
B	Shaft			2S2-3	S2S2-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	Y6-1	U8-25	Power Off-On
R2A	3.4meg	½	24-145-1					Brightness
B	3.4meg	½						Height
R3A	1.5meg	½	24-137-1	F1-64		↑ Q1-096	* (UE3S53	Vert. Hold
B	900KΩ	½		R2-25 *				Vert. Linearity
R4A	200Ω	½	24-135-1	F1-0		↑ Q2-1182	FA3S1,	Contrast
B	Shaft			Not Req.			QB6F1	
R5A	3meg	½	24-135-1	BK-54	B4T-3meg-S	B5L-140	FTA3S5L	AGC
B	Shaft			Not Req.	Not Req.	TA4	Not Req.	
R6	45Ω	2(WW)	24-13-3	WH-500	39-50	U3-50	C50R	Horiz. Drive

† "Concentrikit" equivalent: K-8 kit with base elements and shafts; B11-193, P13-023, (Panel)
Not available as a factory assembled unit. B47-1R, R10, R81, (Rear)
R-5 (Retainer)
◆ "Concentrikit" equivalent: K-8 kit with base elements and shafts; B11-201, P13-023 (Panel),
R-5 (Retainer)
(No Rear elements)
■ "STA-LOC" equivalent: FA3S5L, RU14R, QB6F1, U43T.
* Cut & split rear shaft before assembling.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS
R7	470Ω		R27	680K		R47	150K 1W	
R8	100KΩ		R28	5.6meg		R48	56K	(47K) *
R9	56Ω		R29	56K		R49	6800Ω 2W	
R10	100Ω		R30	2200Ω		R50	12K 1W	
R11	560Ω		R31	820Ω		R51	100Ω	
R12	100Ω		R32	22K 1W		R52	470Ω	Note 1
R13	56Ω		R33	680Ω		R53	470Ω	Note 1
R14	10K		R34	220Ω 1W		R54	10Ω	
R15	100KΩ		R35	470K		R55	470Ω	
R16	22Ω		R36	27K 1W		R56	4.5Ω 10W	#61-115-0
R17	330Ω		R37	560Ω		R57A	2200Ω 20W	#61-163-0
R18	47Ω@ 4W	#61-5-1	R38	560K		B	1200 15W	
R19	220Ω		R39	820K		R58A	3000Ω 5W	#61-167-0
R20	47K		R40	1 meg		B	3000Ω 5W	
R21	680K		R41	1500Ω 2W		R59	2200 1W	(3000) *
R22	39K		R42	150KΩ		R60	470Ω 1W	(680Ω) *
R23	68K		R43	10K		R61	82K 2W	
R24	10K		R44	47K		R62	33K 1W	
R25	56K		R45	150K 2W		R63	10Ω	
R26	10K		R46	8200Ω 2W				

Silverione Part Number.
* Alternate Value.
Note 1. Values may vary. Replace with original.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K1	Brightness & Sync Sep.	150mmf, 5000mmf, 5000mmf, 47K, 100K, 100K, 470K, 2 5meg	13-24-3	Sprague 8T-16
K2	Sound IF Screen	470mmf, 68K	13-23-3 ①	Sprague 2RC-8
K3	Audio Coupling	100mmf, 5000mmf, 1000Ω, 220K, 470K, 560K	13-26-2	Sprague 2DK-6
K4	Vert. Integrator	2000mmf, 10000mmf, 5000mmf, 8200Ω, 8200Ω, 22K	13-21-3	Aerovox PA-116 Centralab PC-100 Cornell-Dubilier 10TM1 Mallory M3-100 Sprague Y1/V3
K5	AFC & Horiz. Osc.	47mmf, 4700mmf, 4700mmf 10000mmf, 10000mmf, 12000Ω, 150Ω, 820Ω, 180Ω, 100K	13-33-5	
K6	Chassis Isolation	1000mmf @ 1000VAC, 4.7meg,	13-17-3	Sprague 2RC-8

① Some versions may use Individual Components in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		SILVERTONE PART No.	Cramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1A	1st Video IF	10-25-3						
B	41.25MC Trap							
L2A	2nd Video IF	10-24-3						
B	47.25MC Trap							
L3	3rd Video IF	10-22-3						
L4	4th Video IF	10-24-3						
L5	RF Choke	10-31-1						
L6	Resonant Choke	10-65-1						12uh
L7	Series Peaking Coil	10-64-1	19-3060	19-3060	TV-193	6110	-	60uh
L8	Shunt Peaking Coil	10-66-1	19-3275	19-3275	TV-196	6130	VP-8	270uh
L8A	4.5MC Trap	10-152-1						
B	1st Sound IF							
L10	Series Peaking Coil	10-66-1	19-3275 †	19-3275 †	TV-196 †	6130 †	VP-8 †	270uh ①
L11	Shunt Peaking Coil	10-66-1	19-3275	19-3275	TV-196	6130	VP-8	270uh
L12	2nd Sound IF	10-23-3						
L13	Quadrature Coil	10-26-5						
L14	RF Choke	10-124-1	19-1008	19-1008	SW-631	4529		4.7uh
L15	Fil. Choke	10-126-1						
L16	Line Choke	10-149-1	19-3036	19-3036	TV-180	6176	VP-1	60uh
L17	Line Choke	10-149-1	19-3036	19-3036	TV-180	6176	VP-1	60uh

† Parallel with 15K Resistor.
① Wound on 15K Resistor. Alt. Part #10-150-1 wound on 8200Ω Resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Hallderson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L28	82Ω		16-167-1						Horiz. Osc. Tap @ 22Ω
L29	43Ω		16-30-2		HS-8	TV-188	6214	HS-8	Horiz. Waveform

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		SILVERTONE PART No.	Hallderson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	Vert. Output	80-7-2	28S75 ①②	A-2815 ①			28S75 ①②	A-18BX ①	
T2	Yoke-Horiz. (30MH) (10Ω)-Vert. (10MH)	80-11-4	Y-53 ②				Y-53 ②	Y-82 & HW-32	
	Alt. Yoke	80-9-4	Y-53 ②				Y-53 ②	Y-82 & HW-32	
	Rear Cover & Centering Yoke	21-590-0						YC-110	
T3	Horiz. Output	80-12-3						D-187 *	

① Use 8 to 1 turns ratio.
② Connect as transformer.
③ Use original rear cover. Use original yoke damping network, if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL (CONNECTIONS)	Hallderson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4							4
5							3
2							2
1							1
A							A
G							G

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Hallderson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	5600Ω	3-4Ω	80-117-1A ①	24B69 ②	A-3018 ②	AU-600 ②	A-3022 ②	24B69 ②	8-5Z ②

① Alternate Part #80-117-1. ② Use original frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	3" x 8"	PM	3-4Ω	33-379-4	5AL	Models 106GY, 106AQ, 106DB, 106-5GY, 106-5AQ,106-5DB
	5"	PM	3-4Ω	33-383-4		Models 118B-L, 118B-CH, 118B-5-L, 118B-5-CH

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	SILVERTONE PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.270A	86-1-3	SD-500	HA-504	40K	SR500	Silicon Type
M2	.270A	86-1-3	SD-500	HA-504	40K	SR500	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	Tuner	95-196-0	VHF
	Tuner	95-304-0	VHF with UHF Provisions
	Tuner	95-193-0	UHF
	Tuner	95-203-0	UHF/VHF (Combination 95-204-0 & 95-193-0)
M4	Antenna	82-164-0	JFD Type TA-383, Models 106GY, 106AQ, 106DB, 106-5GY, 106-5AQ, 106-5DB
	Antenna	82-158-0	Models 118B-L, 118B-CH, 118B-5-L, 118B-5-CH
M5	Width Device	82-133-0	May be used in some versions
M6	Circuit Breaker	82-8-8	Alternate Part #43-7-2
	Printed Board	84-727S-2	IF, Sync & Sound, Less Tubes
	Printed Board	84-908S	Sweep, Less Tubes

SILVERTONE CHASSIS 45A,216A0, 641, 642, 643, 644, 645, 52B,216A0, 661, 662, 663, 664, 665

FOLDER 2

PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	48-152-0	Models 106GY, 106AQ, 106DS, 106-5GY, 106-5AQ, 106-5DS
Safety Glass	48-144-0	Models 118B-L, 118B-CH, 118B-S-L, 118B-5-CH
Knob	52-1313-0	Channel Selector, Models 106GY, 106AQ, 106DS
Knob	52-1314-0	Channel Selector, Models 106-5GY, 106-5AQ, 106-5DS
Knob	52-1300-0	Channel Selector, Models 118B-L, 118B-CH
Knob	52-1277-0	Channel Selector, Models 118B-5-L, 118B-5-CH, 118B-L, 118B-CH
Knob	52-1080-0	Fine Tuning, Models 106GY, 106AQ, 106DS
Knob	52-1017-0	Fine Tuning, Models 118B-L, 118B-CH
Knob	52-1075-0	VHF Fine Tuning, Models 106-5GY, 106-5AQ, 106-5DS
Knob	52-868-0	VHF Fine Tuning, Models 118B-5-L, 118B-5-CH
Knob	52-1078-0	UHF Fine Tuning, Models 106-5GY, 106-5AQ, 106-5DS
Knob	52-886-0	UHF Fine Tuning, Models 118B-5-L, 118B-5-CH
Knob	52-1076-0	Dial Indicator, Models 106-5GY, 106-5AQ, 106-5DS
Knob	52-1019-0	Dial Indicator, Models 118B-5-L, 118B-5-CH
Knob	52-1151-0	Off-On Volume, Models 106GY, 106AQ, 106DS, 106-5GY, 106-5AQ, 106-5DS
Knob	52-1130-0	Off-On Volume, Models 118B-L, 118B-CH, 118B-5-L, 118B-5-CH
Knob	52-1111-0	Brightness, Contrast, Vert. Hold, Models 106GY, 106AQ, 106DS, 106-5GY, 106-5AQ, 106-5DS
Knob	52-1129-0	Brightness, Contrast, Vert. Hold, Models 118B-L, 118B-CH, 118B-5-L, 118B-5-CH
Cabinet	42-164-0	Models 106GY, 106-5GY
Cabinet	42-163-0	Models 106AQ, 106-5AQ
Cabinet	42-165-0	Models 106DS, 106-5DS
Cabinet	42-160-0	Models 118B-CH, 118B-5-CH
Cabinet	42-161-0	Models 118B-L, 118B-5-L
Handle	49-552	Models 106GY, 106-5GY
Handle	49-554	Models 106DS, 106-5DS
Handle	49-553	Models 106AQ, 106-5AQ
Handle	49-479	Models 118B-CH, 118B-5-CH
Handle	49-480	Models 118B-L, 118B-5-L

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools: GENERAL CEMENT #8282, 8606, 8606L, 9295
WALSCO #2526, 2543, 2544, 2545

VHF OSCILLATOR ALIGNMENT

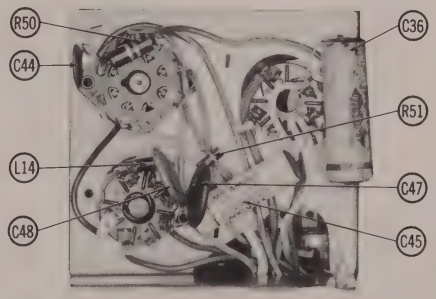
Set the Fine Tuning to the center of its range. One slug for high band adjustment is located at 2 o'clock, and should be adjusted first. The low band adjustment is located at 7 o'clock. Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

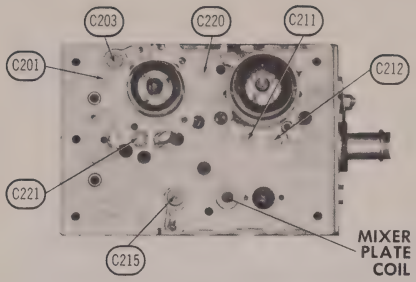
This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.

UHF TUNER ALIGNMENT

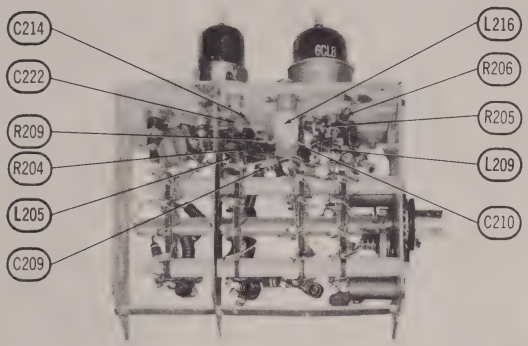
This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.



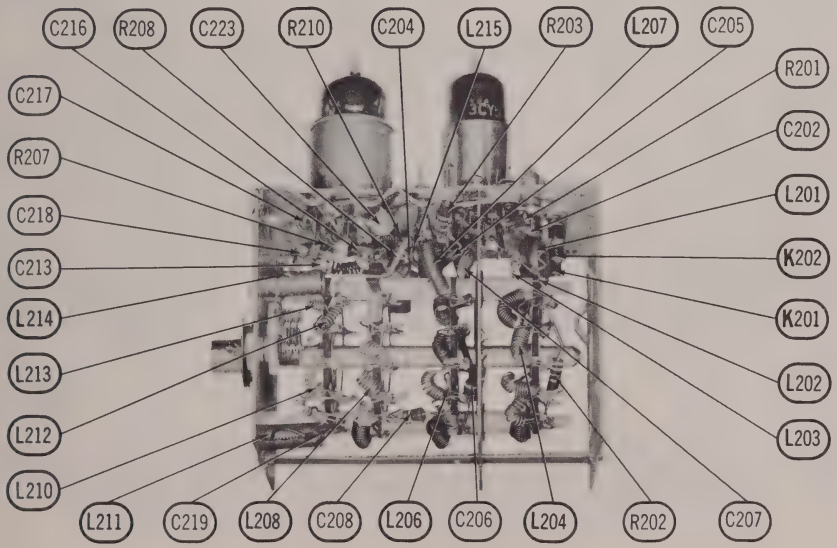
HORIZONTAL OUTPUT SUB CHASSIS



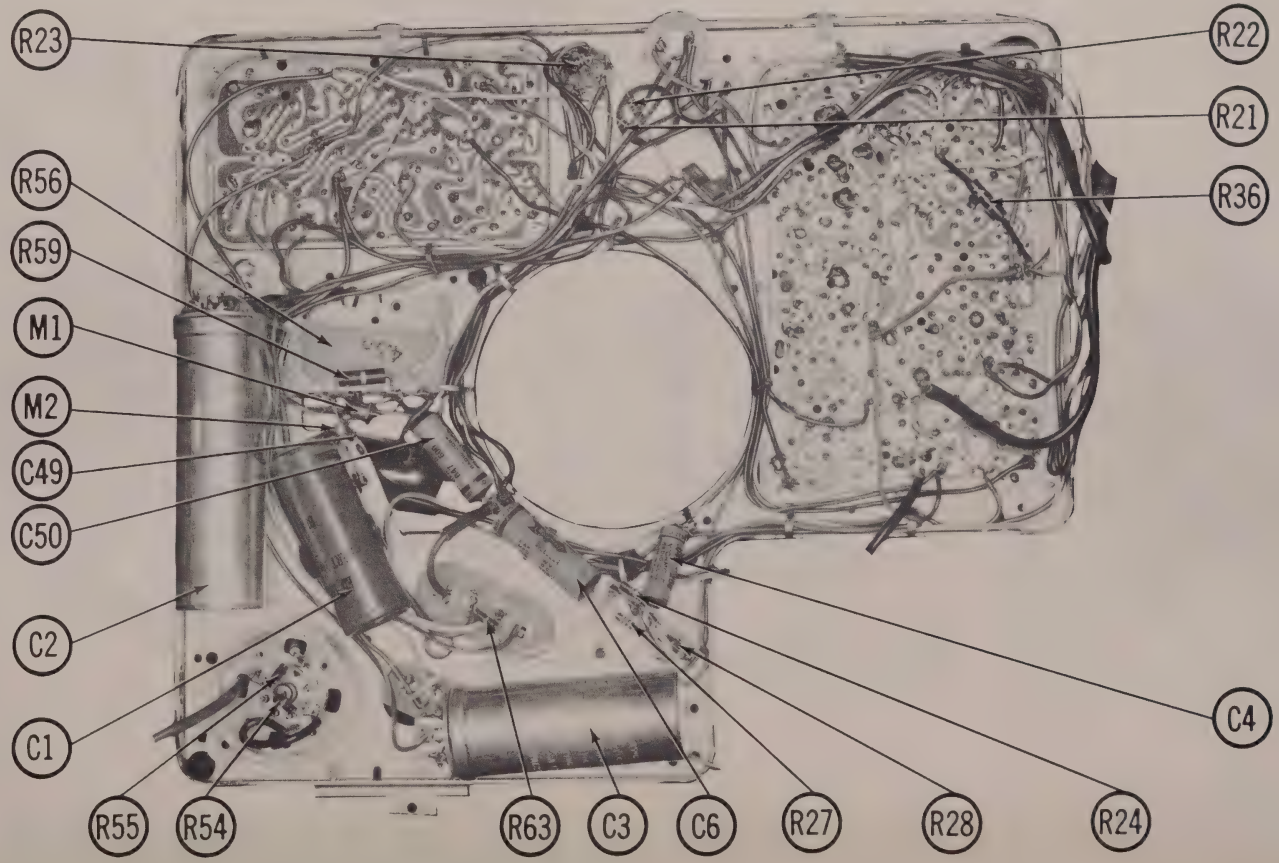
TUNER 95-196-0 - TOP VIEW



TUNER 95-196-0 - LEFT SIDE

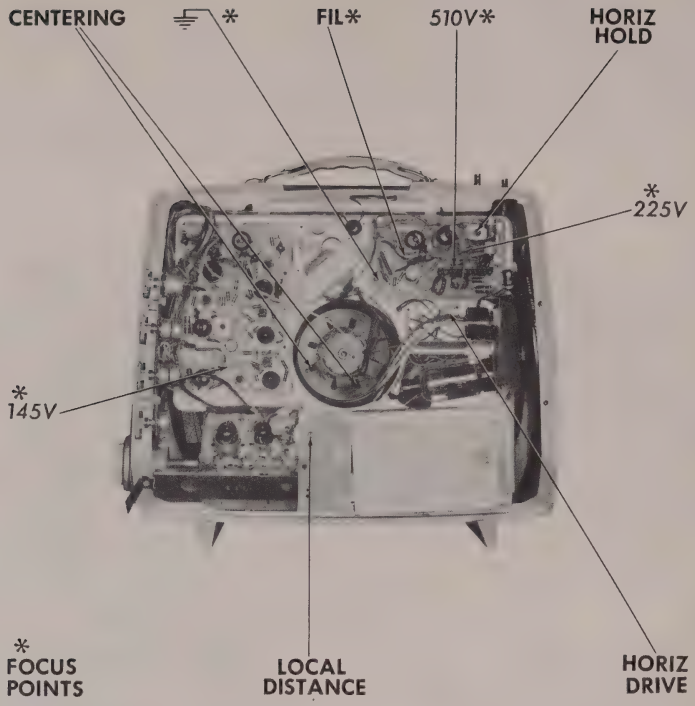


TUNER 95-196-0 - RIGHT SIDE



CHASSIS BOTTOM VIEW

CHASSIS TOP VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station and adjust the Horizontal Hold until the picture synchronizes horizontally. If the picture cannot be synced with the Horizontal Hold, turn the Waveform slug (B1) several turns out of the coil form from its original position. Readjust the horizontal hold until the picture synchronizes horizontally.

Connect the vertical amplifier of the scope thru a low capacity probe to point Ⓓ. Connect low side to chassis. Retouch the Horizontal Hold to synchronize the picture.

Adjust the Waveform slug (B1) for a waveform similar to Fig. 2 with the sharp peak approximately 10% higher than the broad peak. Keep the picture in sync during this adjustment with the Horizontal Hold. Remove scope connection and retouch Horizontal Hold if necessary to synchronize picture horizontally.

Rotate Drive Control clockwise until vertical white line(s) become visible. Turn Drive counterclockwise until drive lines just disappear.

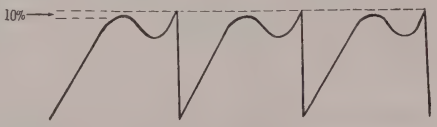


FIG. 2

DISASSEMBLY INSTRUCTIONS

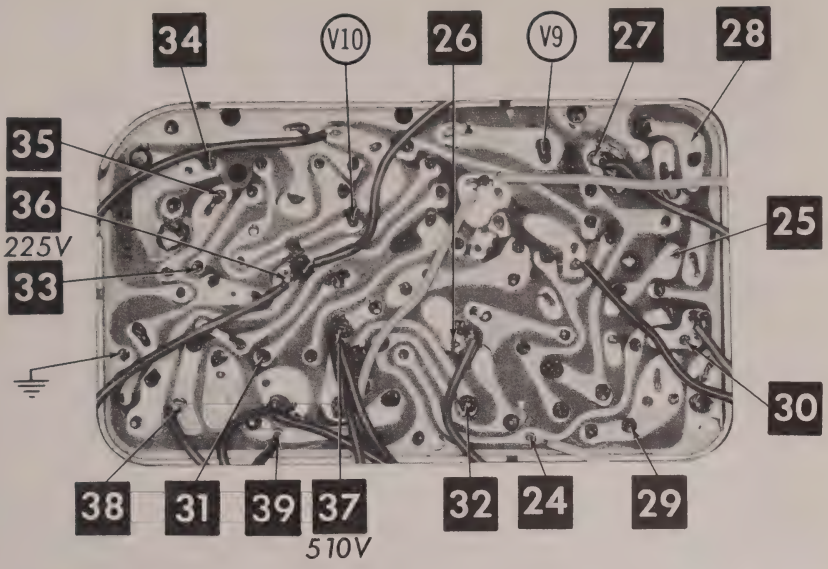
CHASSIS REMOVAL FOR MODEL 106DS (Ch. 528.51660)

1. Remove 6 metal screws holding rear cover. Remove tuner and antenna leads. Remove rear cover.
2. Remove 2 metal screws holding side control mounting bracket.
3. Remove channel selector, fine tuning knobs, and vinyl insert in tuner shaft opening.
4. Remove speaker leads, yoke plug, picture tube socket, and chassis mounting bracket ground lead.
5. Remove 2 metal screws at the top and 2 at the bottom holding the chassis to the cabinet.
6. Partially remove the chassis and remove the hi voltage lead.
7. Remove chassis.

PICTURE TUBE REMOVAL

1. Remove chassis.
2. Remove 5 screws holding metal trim at top of cabinet.
3. Remove 1 metal screw now exposed and 2 at bottom of cabinet holding picture tube mounting strap.
4. Remove picture tube.

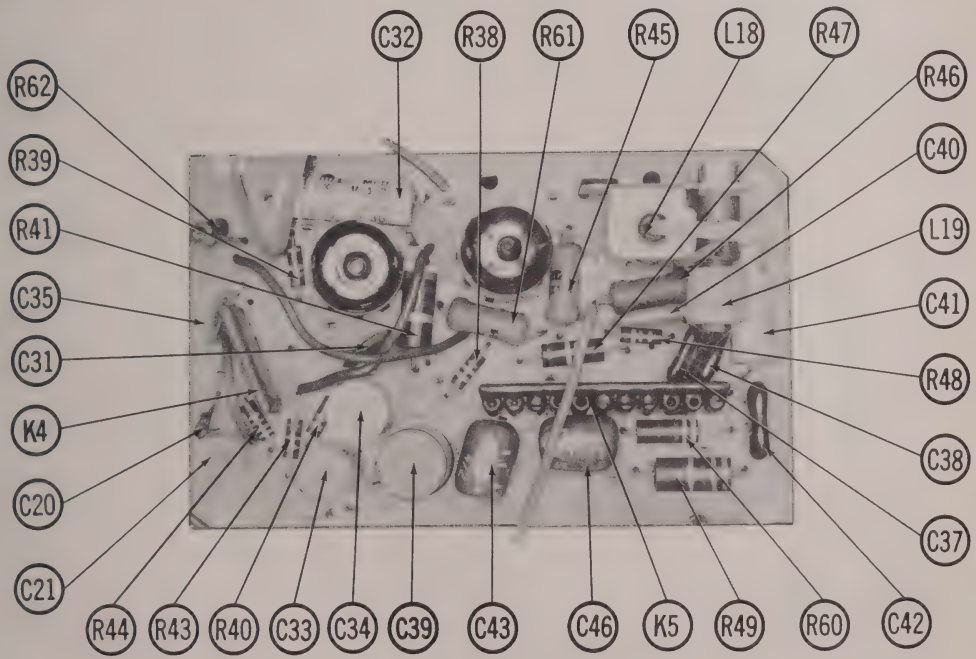
CircuiTrace Numbers 24 thru 39



A Howard W. Sams CIRCUITRACE Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

SWEEP PRINTED BOARD



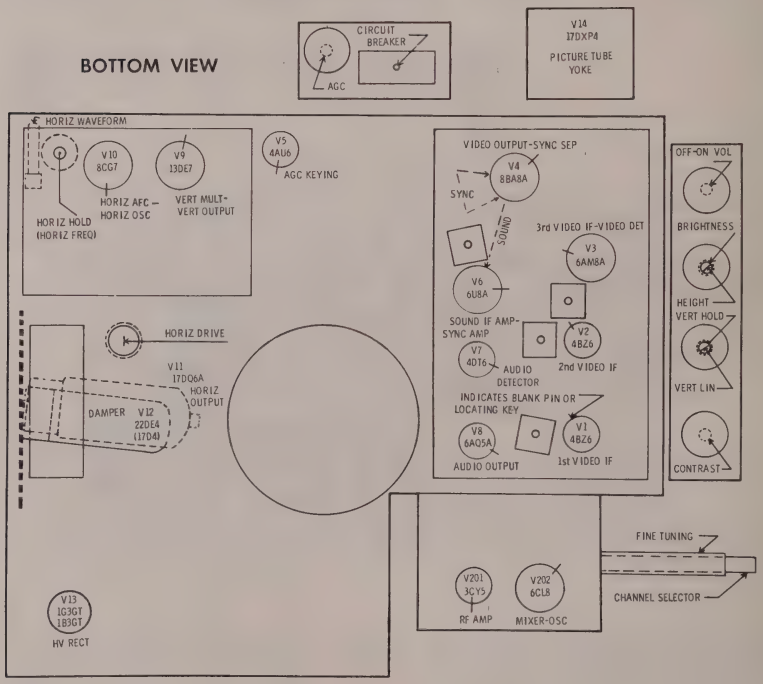
SWEEP PRINTED BOARD

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	4BZ6	60K	56Ω	4.5Ω	6Ω	†4000Ω	†4000Ω	0Ω		
V2	4BZ6	57K	56Ω	6Ω	7.5Ω	†4000Ω	†4000Ω	0Ω		
V3	6AM8A	220Ω	.2Ω	†4200Ω	7.5Ω	9.5Ω	†4200Ω	.2Ω	3300Ω	0Ω
V4	8BA8A	0Ω	2.2meg	†470K	12Ω	9.5Ω	• 20Ω	3300Ω	†5400Ω	† 5300Ω
V5	4AU6	†50K	† 590Ω	4.5Ω	3Ω	275K	†55K	† 590Ω		
V6	6U8A	†27K	4Ω	†73K	12Ω	14.5Ω	†5400Ω	220Ω	5600Ω	†470K
V7	4DT6	5.2Ω	680Ω	14.5Ω	16Ω	+ 700K	†22K	560K		
V8	6AQ5A	0Ω	220Ω	16Ω	17.5Ω	†3250Ω	†3000Ω	0Ω		
V9	13DE7	† 490Ω	1meg	1meg	23Ω	19Ω	• +1.1meg	• 1.2meg	0Ω	• 750Ω
V10	8CG7	+ 80K	830K	0Ω	27Ω	23Ω	†590Ω	1.5meg	760K	NC
V11	17DQ6A	TP	35Ω	TP	†7400Ω	1meg	NC	32Ω	• 3.5Ω	TOP CAP + 21Ω
V12	22DE4	NC	TP	¶ 1meg	TP	†120Ω	NC	27Ω	32Ω	
V13	1G3GT 1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP + 430Ω
V14	17DXP4	19Ω	58K	+ 12K	† 590Ω	NC	NC	• 320K	17.5Ω	
V201	3CY5	1meg	0Ω	3Ω	2Ω	†3200Ω	†15K	0Ω		
V202	6CL8	15K	†21K	0Ω	0Ω	2Ω	†5400Ω	†30K	0Ω	225K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 265V SOURCE.
+ MEASURED FROM PIN 3 OF V12.
NC NO CONNECTION
TP TIE POINT

BOTTOM VIEW



TUBE PLACEMENT CHART

PHOTOFACT® Folder

ADMIRAL MODELS
761, 767 (Ch. 3N1)

ADMIRAL MODELS
761, 767 (Ch. 3N1)

MODEL 761

ADMIRAL MODELS
761, 767 (Ch. 3N1)

TRADE NAME	Admiral Models 761, 767 (Ch. 3N1)
MANUFACTURER	Admiral Corp., 3800 W. Cortland Street, Chicago 47, Illinois
TYPE SET	AC Operated 3 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 33 Watts, .36 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE ADMIRAL RC607-1 - PHOTOFACT SET 398 FOLDER 7.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JT663

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7

ITEM No.	USE	TYPE
V2	Left Channel Output	50C5
V3	Right Channel Output	50C5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■80	150	67D7-78 ①	AFH3-12-20	XB0161	FP311. 8	TMD-17	TVL-2435	
B	▲50	150			BR8015	TC492	TD-50-150	TVA-1414	
C	50	150							
C2A	20	150	67B26-6		BBRD3215	TCD46	TDLD-4	TVA-2421	
B	25	15		PRS2170					

① Alternate Part #65D7-78.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C4	35 N750		N750-SI 36	TCZ-36	C10Q36U	CCTN-390	CN7-439	10TCU-Q39
C5	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C6	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C7	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C8	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C10	35 N750		N750-SI 36	TCZ-36	C10Q36U	CCTN-390	CN7-439	10TCU-Q39
C11	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C12	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C13	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C14	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C15	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C16	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3meg		75B50-1					Loudness Balance (Left)
	1meg tap							
B	3meg							Loudness Balance (Right)
	1meg tap							
R2A	1meg		75B46-5	B-70	AD47-1meg	Q13-137	■ UE1707	Tone (Left)
B	1meg			SR-70	Not Req.	M13-137		Tone (Right)
C	Shaft			Not Req.	KSS-3	Not Req.		

■ "STA-LOC" Equivalent: FA16A, RU16A, CS3500.

RESISTORS

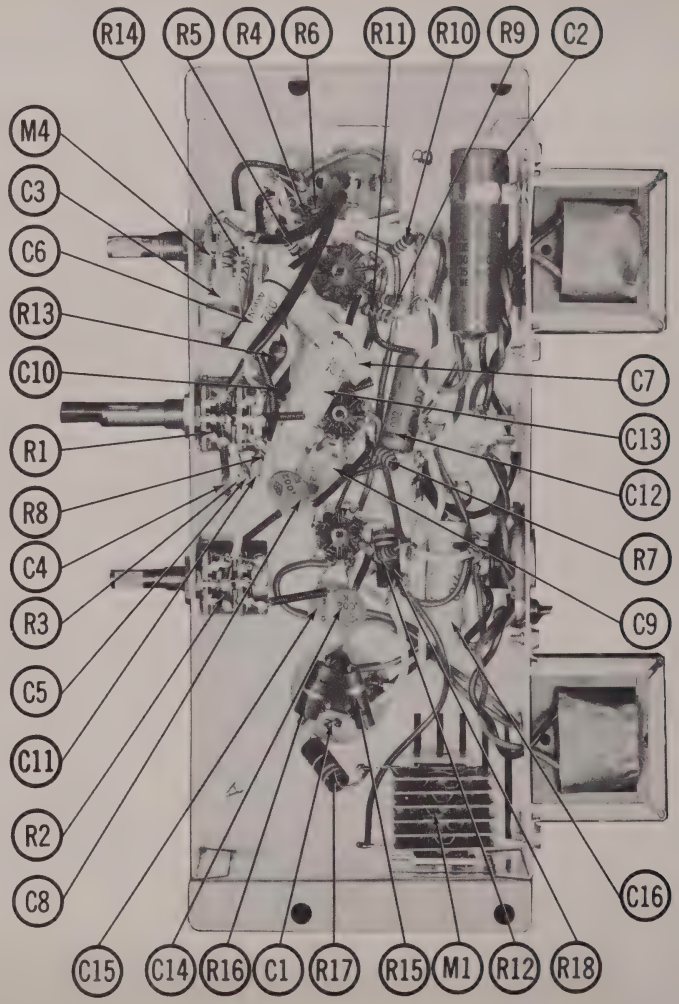
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	100K	
R4	1.8meg	
R5	470K	
R6	330Ω	
R7	470K	
R8	100K	

ITEM No.	RATING	REMARKS
R9	1.8meg	
R10	470K	
R11	330Ω	
R12	470K	
R13	75Ω 2W	
R14	33K	

ITEM No.	RATING	REMARKS
R15	1000Ω 1W	
R16	100Ω 2W	
R17	33Ω 2W	
R18	33Ω 2W	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2900Ω	3-4Ω	79D33-21 ①	26S50	A-3018	AU-604	A-3823 ②	26S50	S-1X ②	① Alternate Part #79B33-21 ② Drill new mounting hole.
T2	2900Ω	3-4Ω	79D33-21 ①	26S50	A-3018	AU-604	A-3823 ②	26S50	S-1X ②	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ADMIRAL PART No.	QUAM PART No.	NOTES
SP1	5 1/4"	PM	3-4Ω	78C150-4 ①	52A21	① Model 761 ② Model 767
SP2	5 1/4"	PM	3-4Ω	78C150-4 ①	52A21	
	5 1/4"	PM	6-8Ω	78C150-6 ②		
	4"	PM	6-8Ω	78C149-3 ②		

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA ADMIRAL PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.085A	93D1-16 ①	T150 ①	1235AH ①	150 ①	SR200 ②	① Selenium Type. ② Silicon Type.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA ADMIRAL PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE
M2	409C34-1	13TB	Not Req.	26S	Not Req.			8TA4-S	N-8TA-S

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA ADMIRAL PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	REMARKS
M3	98C95-1 † or 98C95-2	W-103STSS † or W-103STDD ♦	S-69X † or S-69XSD † ♦ or S-69XDD ♦	† Jewel ♦ Diamond

MISCELLANEOUS

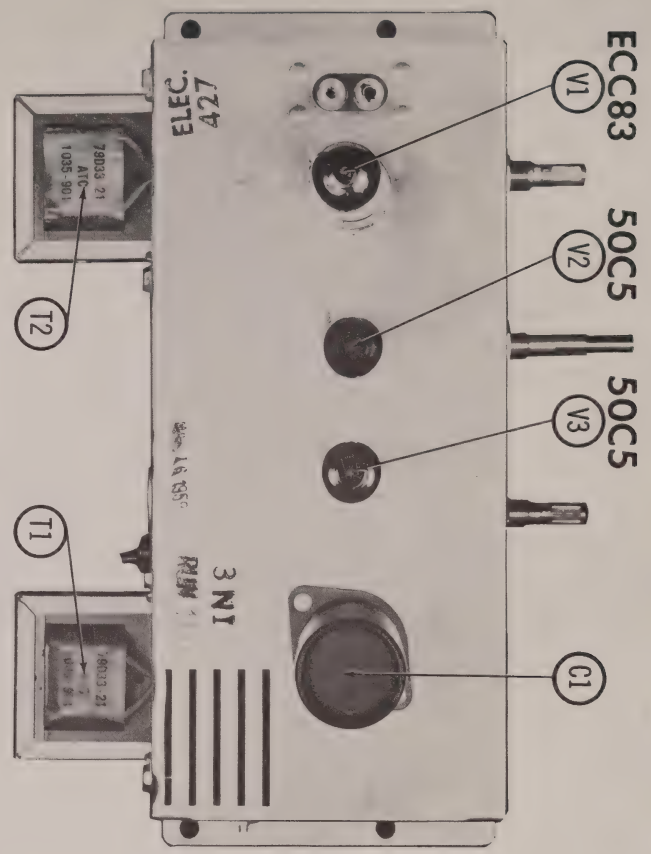
ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M4	Switch	77A88-1	Standard-Stereo (Rotary Wafer Type)
M5	Switch	408A1	Off-On-Reject (Part of Changer)
M6	Motor	407C28	Turntable Drive (Part of Changer)
	45RPM Spindle	400C686-1	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

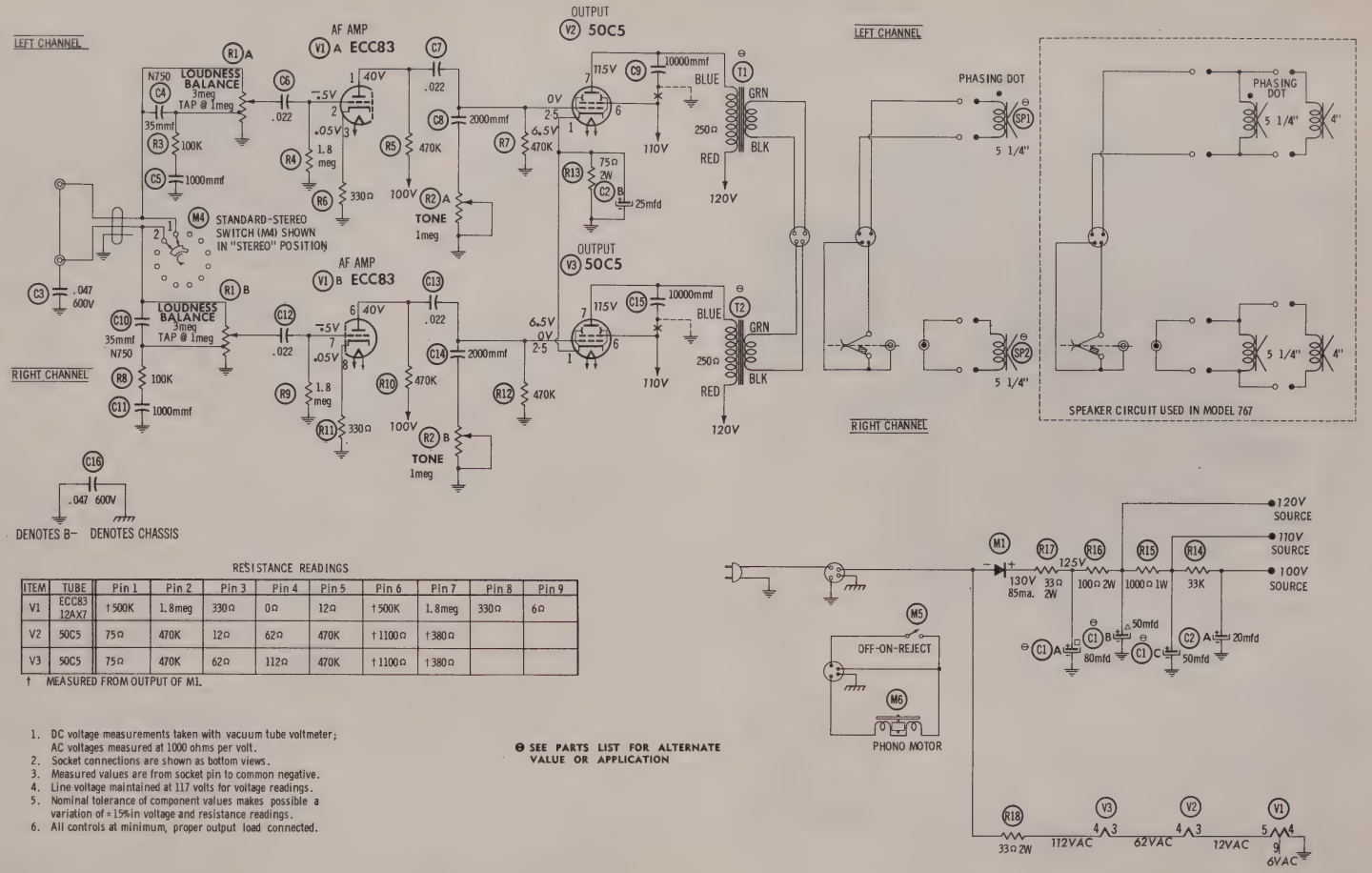
NAME	PART NO.	DESCRIPTION
Knob	33C254-16	Loudness, Balance, Tone
Knob	403D86-4	Changer Control
Cabinet	35E512-1	Model 761
Cabinet	35E511-1	Model 767
Handle	35E512-51	Model 761
Handle	35E511-51	Model 767

CHASSIS—TOP VIEW



WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†500K	1.8meg	330Ω	0Ω	12Ω	†500K	1.8meg	330Ω	6Ω
V2	50C5	75Ω	470K	12Ω	62Ω	470K	†1100Ω	†380Ω		
V3	50C5	75Ω	470K	62Ω	112Ω	470K	†1100Ω	†380Ω		

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ADMIRAL MODELS 761, 767 (Ch. 3N1)

PHOTOFACT® Folder

CHALLENGER
MODEL TC-322

CHALLENGER
MODEL TC-322

CHALLENGER
MODEL TC-322

TRADE NAME	Challenger Model TC322		
MANUFACTURER	Bogen-Presto Co., A Div. of the Siegler Corp., P. O. Box 500, Paramus, N. J.		
TYPE SET	AC Operated 7 Tube FM-AM Tuner		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	37 Watts, .34 Amp. @ 117 Volts AC
TUNING RANGE	BROADCAST 530 - 1670KC	FREQ. MOD.	88 - 108MC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JL920

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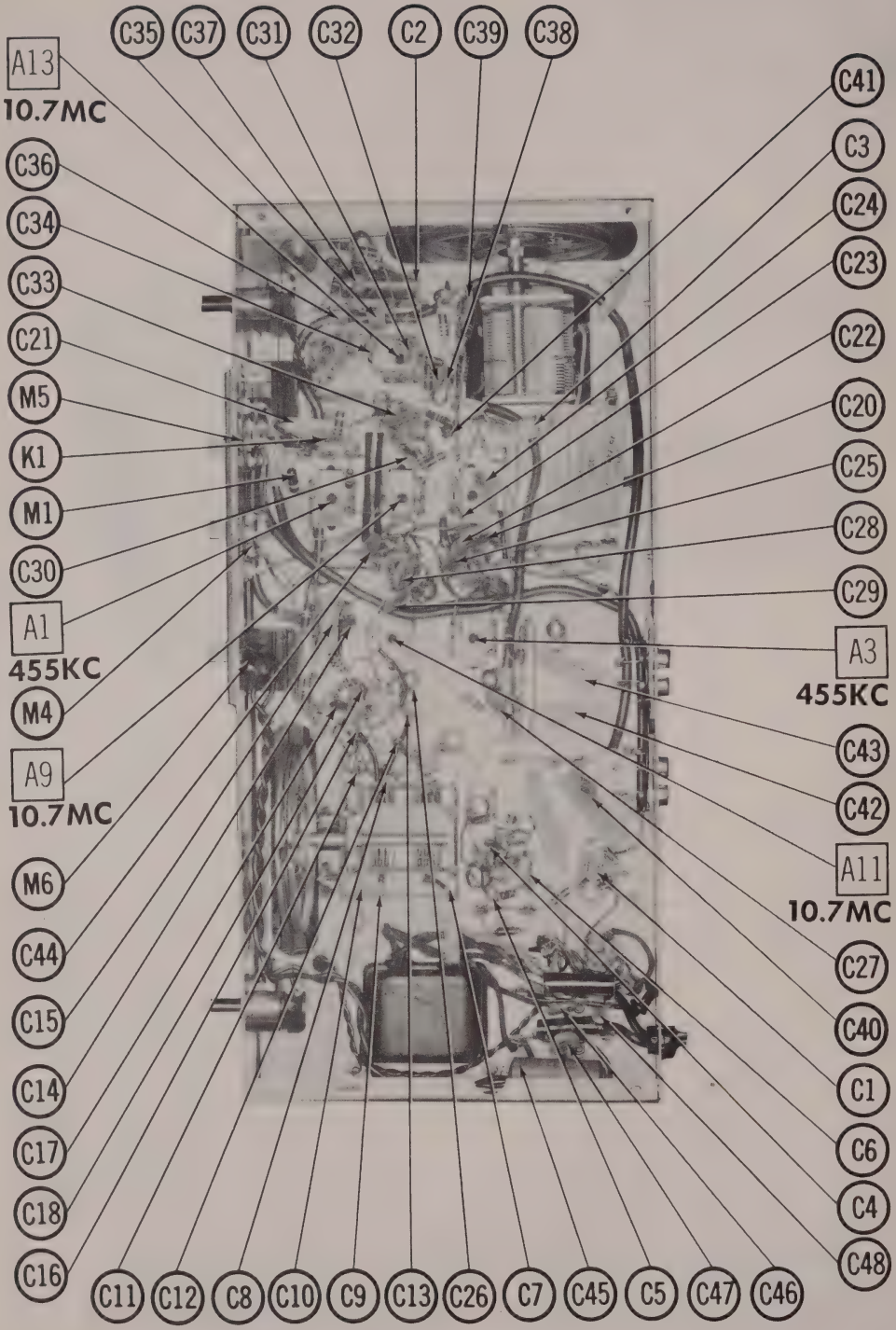
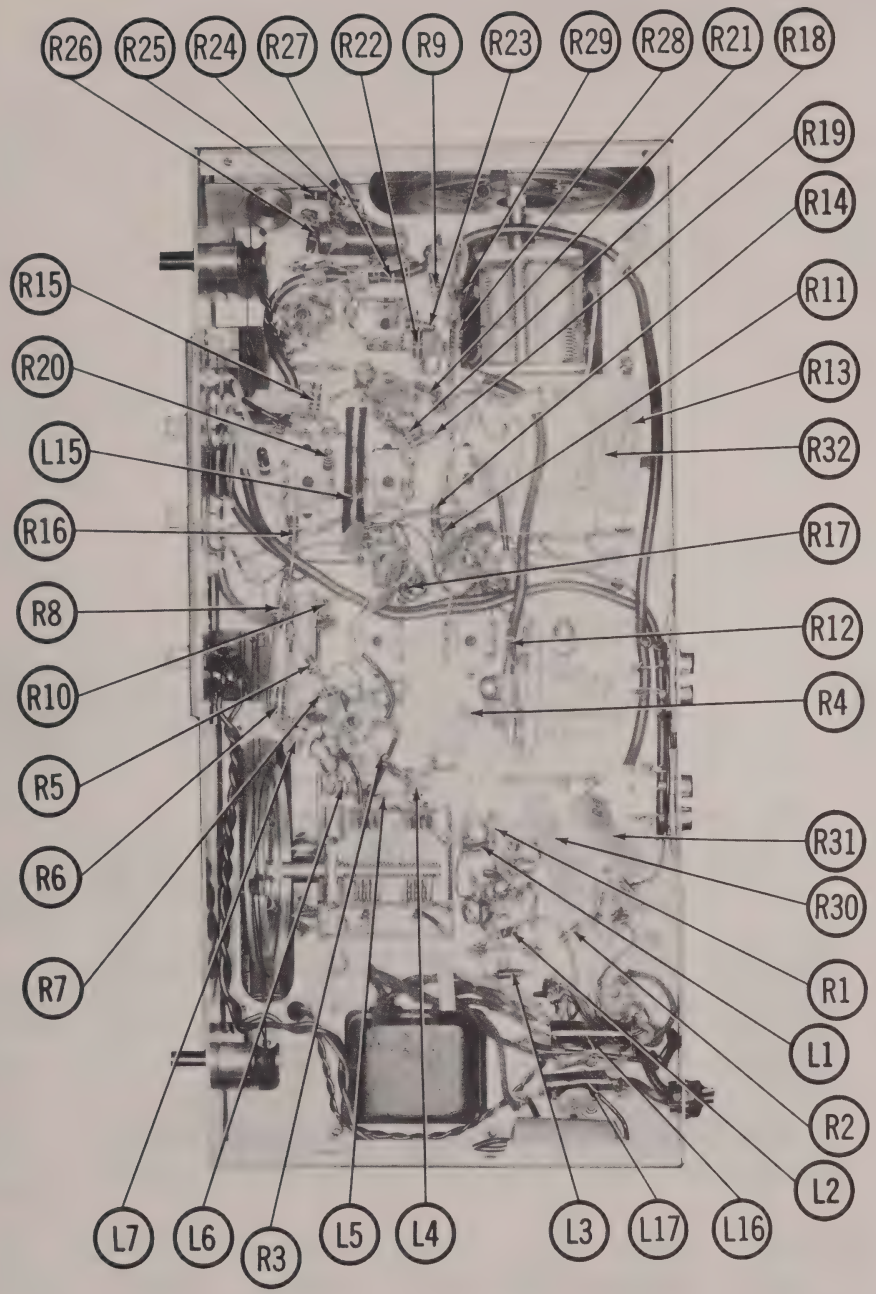


CHASSIS BOTTOM VIEW – ALIGNMENT, CAPACITOR & MISC. IDENT.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

AM ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

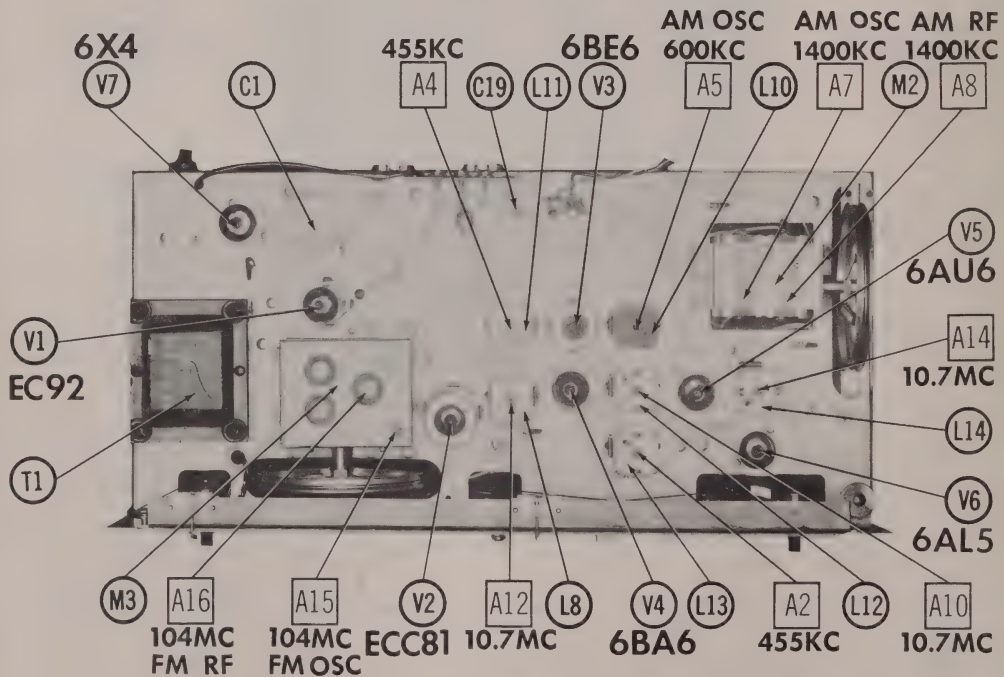
Use only enough sweep generator output to provide a usable indication on VTVM.

Suggested Alignment Tools:

A1 thru A4, A9, A10, A13, A14	GENERAL CEMENT #5097, 8727 WALSCO #2515
A5	GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440 WALSCO #2526, 2543, 2544, 2545
A7, A8, A16	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A11, A12	GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, WALSCO #2515, 2531, 2532 8987, 8988, 8989
A15	GENERAL CEMENT #5003, 8271, 8275, 8276, 8609, 8721, WALSCO #2516, 2518, 2519 8722, 9150, 9298

AM ALIGNMENT - SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of AM Conv. Low side to chassis.	455KC (400∿ Mod.)	(AM) 1400KC	AC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	High side to AM antenna term. Low side to chassis.	600KC	600KC	"	A5, A6	"
3.	"	1400KC	1400KC	"	A7, A8	Adjust for maximum deflection. Repeat step 2.



CHASSIS—TOP VIEW

FM ALIGNMENT INSTRUCTIONS

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

AFC "Off".

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	High side thru .01mfd to pin 2 (grid) of FM Conv. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference	DC probe to point Ⓑ. Common to chassis.	A9, A10, A11, A12	Adjust for maximum deflection.
5.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A13	"
6.	"	"	"	DC probe to point Ⓓ. Common to chassis.	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

AFC "Off".
Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	High side thru .01mfd to pin 2 (grid) of FM Conv. Low side to chassis.	10.7MC (450KC swp)	(FM) Point of non-interference	Vert. Amp. to point Ⓑ. Low side to chassis.	A9, A10, A11, A12	Adjust for maximum gain and symmetry of response similar to Fig. 1.
5.	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A13	Disconnect Stabilizing Capacitor (C2). Adjust for maximum gain and symmetry of response similar to Fig. 1.
6.	"	"	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A14	Reconnect C2. Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	104MC (Unmod.)	(FM) 104MC	DC probe to point Ⓑ. Common to chassis.	A15, A16	Adjust for maximum deflection.
8.	"	90MC	90MC	"	L4, L6	If necessary, adjust by expanding or compressing coil turns for maximum deflection. Repeat step 7.

FIG. 1

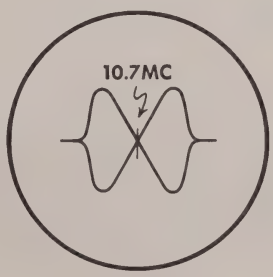
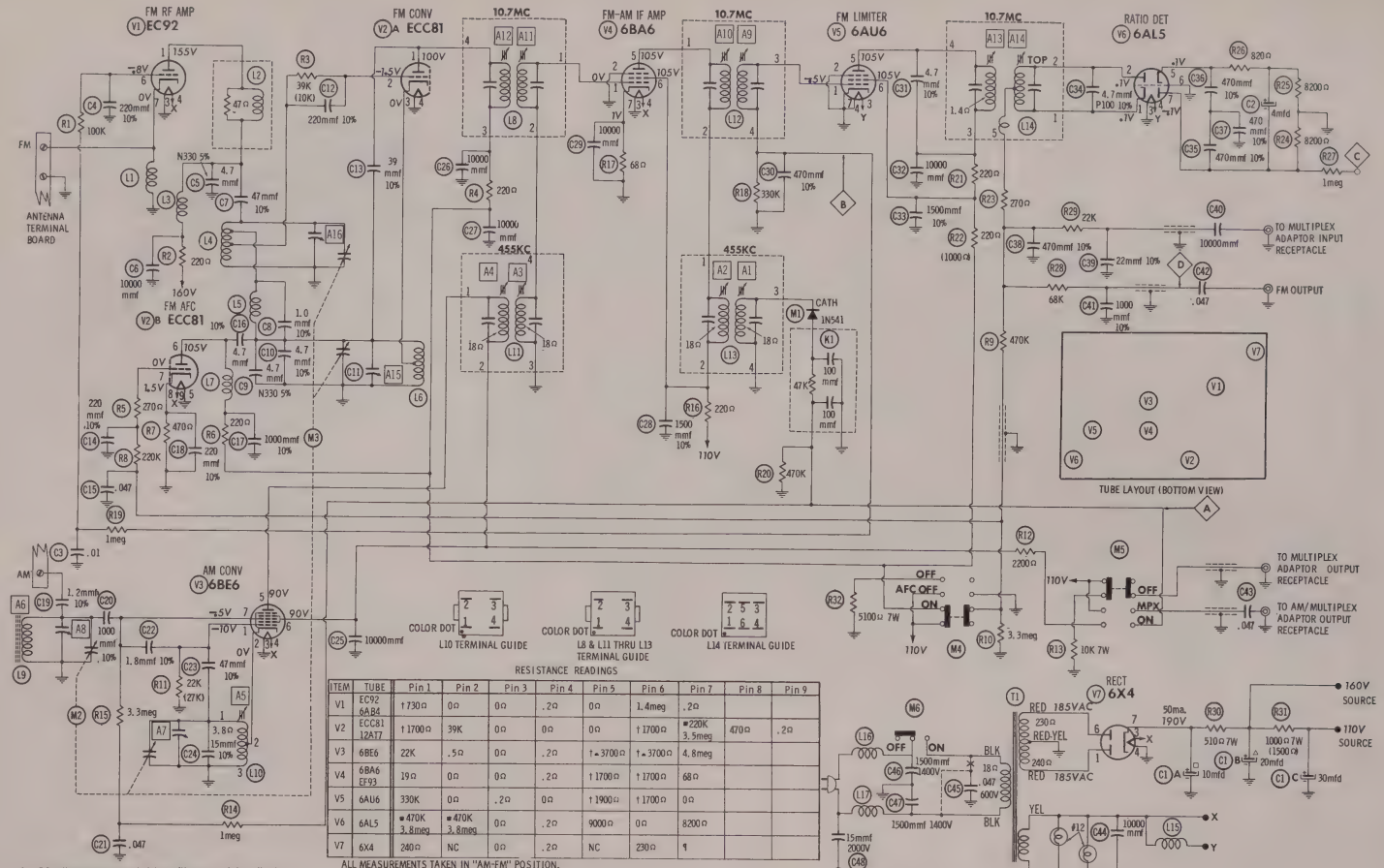


FIG. 2



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	EC92 6AB4	†730Ω	0Ω	0Ω	.2Ω	0Ω	1.4meg	.2Ω		
V2	ECC81 12AT7	†1700Ω	39K	0Ω	0Ω	0Ω	†1700Ω	▪220K 3.5meg	470Ω	.2Ω
V3	6BE6	22K	.5Ω	0Ω	.2Ω	†▲3700Ω	†▲3700Ω	4.8meg		
V4	6BA6 EF93	19Ω	0Ω	0Ω	.2Ω	†1700Ω	†1700Ω	68Ω		
V5	6AU6	330K	0Ω	.2Ω	0Ω	†1900Ω	†1700Ω	0Ω		
V6	6AL5	▪470K 3.8meg	▪470K 3.8meg	0Ω	.2Ω	9000Ω	0Ω	8200Ω		
V7	6X4	240Ω	NC	0Ω	.2Ω	NC	230Ω	¶		

ALL MEASUREMENTS TAKEN IN "AM-FM" POSITION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V7. ▲ MEASURED IN "AM" POSITION.
▪ MEASURED IN "AFC ON" POSITION. NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

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CHALLENGER MODEL TC-322

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	FM RF Amplifier	EC92/6AB4
V2	FM Converter - FM AFC	ECC81/12AT7
V3	AM Converter	6BE6
V4	FM-AM IF Amplifier	6BA6/EF93
V5	FM Limiter	6AU6
V6	Ratio Detector	6AL5
V7	Rectifier	6X4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA CHALLENGER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■10	250	79-010-009	AFH3-18	C0140	FP319.8	TMT-18	TVL-3534	
B	▲20	200							
C	30	150							
C2	4	15	79-001-036	PRS1400	BBR4-50	TT50X4	TD-4-25	TVA-1402	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C4	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C5	4.7 N330 5%					*		
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C7	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C8	1.0 10%		NPO-SI 1.0	TCZ-1			CNO-510	10TCC-V10
C9	4.7 N330 5%					*		
C10	4.7 10%		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C11								
C12	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C13	39 10%		DI-39	DD-390	L10Q39	CCD-390	GP439	10TS-Q39
C14	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C15	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C16	4.7 10%		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C17	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C18	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C19	1.2 10%		NPO-SI 1.5	TCZ-1R5	C10V15C		CNO-515	10TCC-V12
C20	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C21	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C22	1.8 10%		NPO-SI 2.0		C10V2C			10TCC-V18
C23	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C24	15 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C25	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C26	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C27	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C28	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C29	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C30	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C31	4.7 10%		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C32	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C33	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C34	4.7 P100 10%					*		
C35	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C36	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C37	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C38	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C39	22 10%		DI-22	DD-220	L10Q22	CCD-220	GP422	10TS-Q22
C40	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C41	1000 10%		DI-1000	DD-102	PM601	CCD-102	GP210	10TS-D10
C42	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C43	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C44	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C45	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C46	1500 1400V		HVD-15-1500	DD30-152	HVB20D15	16DP-1-152	2HV-215	30GA-D15
C47	1500 1400V		HVD-15-1500	DD30-152	HVB20D15	16DP-1-152	2HV-215	30GA-D15
C48	15 2000V		HVD-30-15	DD30-150	HVA20Q15	3CCD-150	2DY-415	30GA-Q15

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	100K	
R2	220Ω	
R3	39K	(10K) *
R4	220Ω	
R5	270Ω	
R6	220Ω	
R7	470Ω	
R8	220K	
R9	470K	
R10	3.3meg	
R11	22K	(27K) *

ITEM No.	RATING	REMARKS
R12	2200Ω	
R13	10K 7W	
R14	1meg	
R15	3.3meg	
R16	220Ω	
R17	68Ω	
R18	330K	
R19	1meg	
R20	470K	
R21	220Ω	
R22	220Ω	(1000Ω) *

ITEM No.	RATING	REMARKS
R23	270Ω	
R24	8200Ω	
R25	8200Ω	
R26	820Ω	
R27	1meg	
R28	68K	
R29	22K	
R30	510Ω 7W	
R31	1000Ω 7W	(1500Ω) *
R32	5100Ω 7W	

* Alternate

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	CHALLENGER PART No.	REPLACEMENT DATA	
K1	AM Det. RF Filter	100mmf, 100mmf, 47K	78-907-001	Aerovox	PA-97
				Centralab	PC-50
				Cornell-Dubilier	111TM1
				Sprague	D-1

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA CHALLENGER PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Cathode Choke	95-5005-02	19-1001	19-1001	BC-562	4604		1.5uh ①
L2	RF Choke	95-5001-01						
L3	RF Choke	95-5005-02	19-1001	19-1001	BC-562	4604		1.5uh
L4	FM RF Coil	95-0003-26						
L5	RF Choke	95-5005-02	19-1001	19-1001	BC-562	4604		1.5uh
L6	FM Osc. Coil	95-0003-27						
L7	RF Choke	95-5019-01	19-1000	19-1000	BC-561	4602		1uh ②
L8	1st FM IF Trans.	95-5021-01	16-3487	16-3487	FM-254	1463		
L9	Loopstick	95-5022-01			BC-419			
L10	AM Osc. Coil	95-5009-01						
L11	1st AM IF Trans.	95-5013-01	16-6758	16-6758	BC-352	12-C1	RF-1	
L12	2nd FM IF Trans.	95-5010-01	16-3487	16-3487	FM-254	1463		
L13	2nd AM IF Trans.	95-5013-01	16-6758	16-6758	BC-353	12-C2	RF-2	
L14	Ratio Detector	95-5012-01	17-3498	17-3498	FM-255	1465		
L15	Fil. Choke	95-5015-01	19-1001	19-1001	BC-562	4604		1.5uh
L16	Line Choke	95-5015-01	19-1001	19-1001	BC-562	4604		1.5uh
L17	Line Choke	95-5015-01	19-1001	19-1001	BC-562	4604		1.5uh

① Wound on 47Ω Resistor.

② IRC Part #CLA.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	CHALLENGER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .34A	370VCT @ .050A	6.3V @ 2.7A	83-620-000						

CRYSTAL DIODES

ITEM No.	ORIG TYPE	REPLACEMENT DATA				NOTES
		CHALLENGER PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M1	1N541		1N636	1N295	1N295	AM Detector (Pigtail)

MISCELLANEOUS

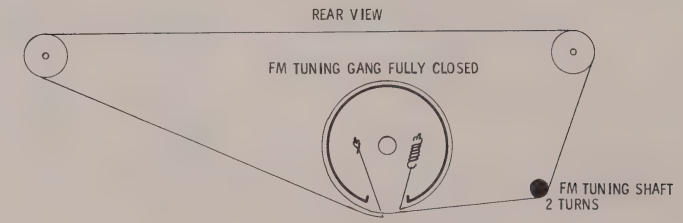
ITEM No.	PART NAME	CHALLENGER PART No.	NOTES
M2	Tuning Cap.	80-0122-01	2 Gang, AM
M3	Tuning Cap.	80-0123-01	2 Gang, FM
M4	Switch	81-003-001	FM-AFC (4 Pole, 3 Position) (Slide Type)
M5	Switch	81-003-001	AM-MPX (4 Pole, 3 Position) (Slide Type)
M6	Switch	81-003-004	Power Off-On (SPDT Slide Type)

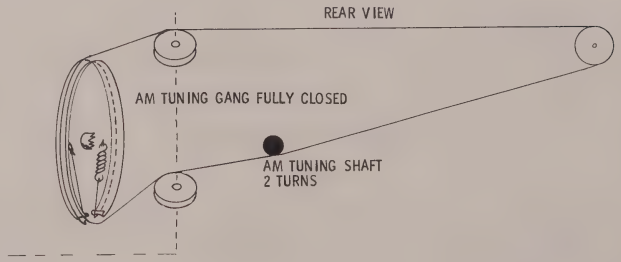
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

DIAL CORD STRINGING

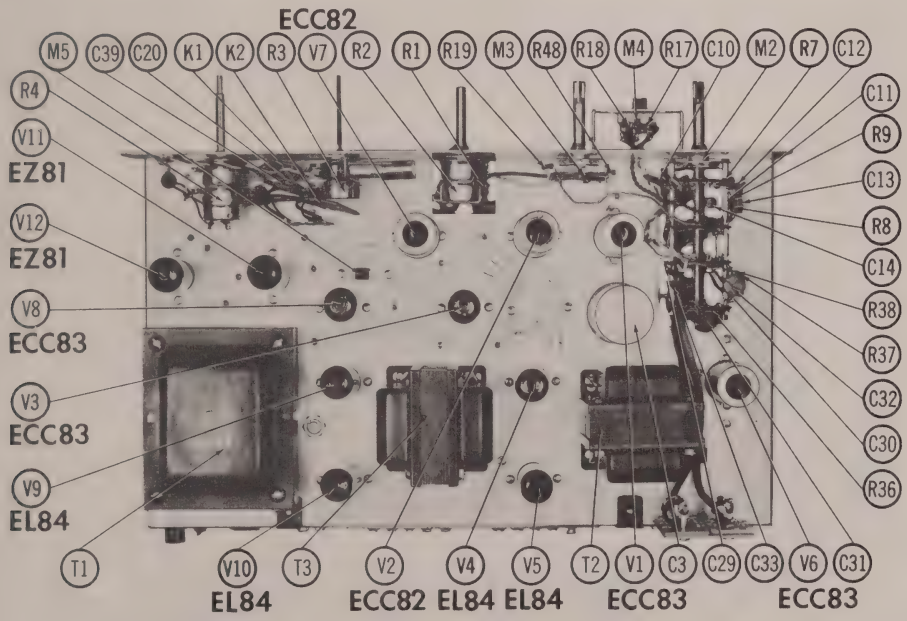




PHOTOFACT® Folder

EICO
MODEL HF-81

TRADE NAME	Eico Model HF-81		
MANUFACTURER	Electronic Instrument Co., Inc., 33-00 Northern Blvd., Long Island City 1, N. Y.		
TYPE SET	AC Operated 12 Tube Stereo Amplifier		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	125 Watts, 1.2 Amp. @ 117 Volts AC



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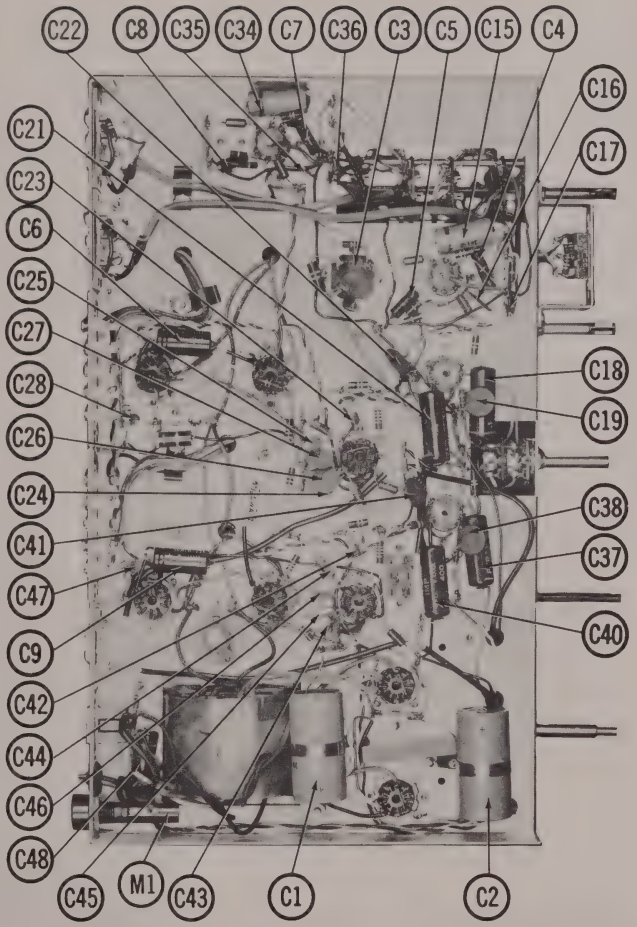
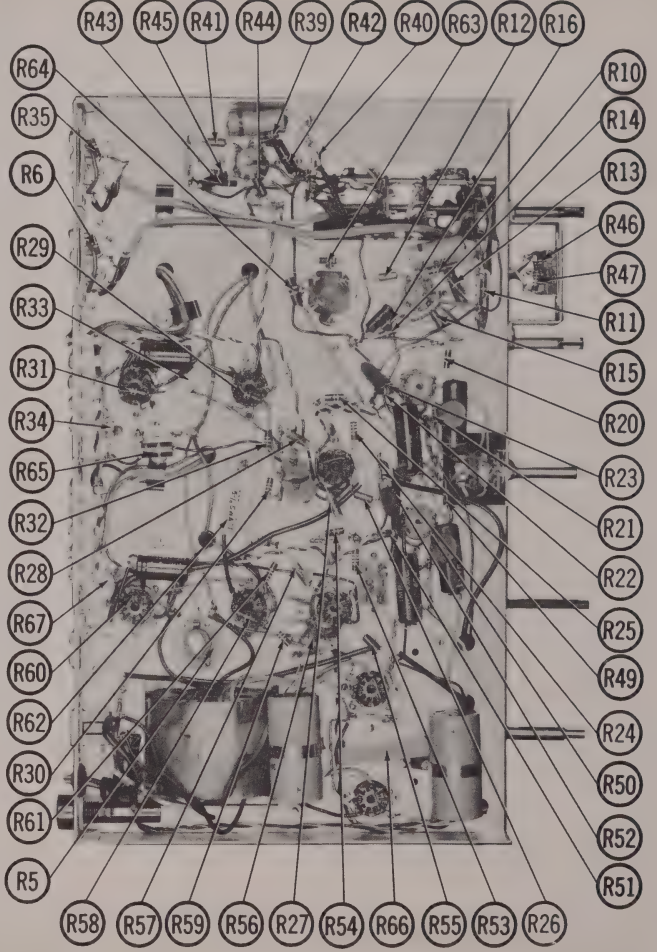
EICO
MODEL HF-81

EICO
MODEL HF-81

SET 481 FOLDER 5



CHASSIS BOTTOM VIEW
CAPACITOR & MISC. IDENT.



CHASSIS BOTTOM VIEW — RESISTOR IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel 1 Preamp.	ECC83/12AX7	V7	Channel 2 AF Amp.	ECC82/12AU7A
V2	Channel 1 AF Amp.	ECC82/12AU7A	V8	Channel 2 AF Amp. - Phase Inverter	ECC83/12AX7
V3	Channel 1 AF Amp. - Phase Inverter	ECC83/12AX7	V9	Channel 2 Output	EL84/6BQ5
V4	Channel 1 Output	EL84/6BQ5	V10	Channel 2 Output	EL84/6BQ5
V5	Channel 1 Output	EL84/6BQ5	V11	Rectifier	EZ81/6CA4
V6	Channel 2 Preamp.	ECC83/12AX7	V12	Rectifier	EZ81/6CA4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA EICO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	30	400	23016	PRS1740	BR3045	TC77	TD-30-450	TVA-1711	
C2	30	400	23016	PRS1740	BR3045	TC77	TD-30-450	TVA-1711	
C3A	▲20	400	24005	AFH3-43-50	C0330	FP376. 9	TMT-39	TVL-3786	
B	■40	350							
C	▲40	350							
C4	25	10	①	XPP-10025	NLW25-10	TT10X25	TD-25-25	TE-1118	
C5	10	6	23014	XPP-6010	NLW10-6	TT6X10	ML10-6	TE-1087	
C6	50	25	23007	SRE25V50	NLW50-10	TC29	TD-50-25	TE-1209	
C7	25	10	①	XPP-10025	NLW25-10	TT10X25	TD-25-25	TE-1118	
C8	10	6	23014	XPP-6010	NLW10-6	TT6X10	ML10-6	TE-1087	
C9	50	25	23007	SRE25V50	NLW50-25	TC29	TD-50-25	TE-1209	

① 25mfd ② 6V may be used in some versions (#23020).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C10	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C11	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C12	850 10%		DI-820	DD-821		CCD-821	GP382	10TS-T82
C13	2700 10%		DI-2700		5R5T27	CCD-272	GEM-16225	10TS-D27
C14	600 10%		DI-680	DD-601	1R5T6	CCD-681	GP360	10TS-T60
C15	.25 200V		P288N-25		CUB2P25	2DP-4-254	GEM-2025	2TM-P25
C16	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C17	1200 10%		DI-1200	DD-122	1R5D12	CCD-122	GP212	10TS-D12
C18	.1 400V 10%		V84C4P1-10%		PM4P1	4DP-3-104		4TM-P1
C19	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C20	1200 10%		DI-1200	DD-122	1R5D12	CCD-122	GP212	10TS-D12
C21	.1 400V 10%		V84C4P1-10%		PM4P1	4DP-3-104		4TM-P1
C22	10000 10%		DI-10000		PM6S1	CCD-103	GEM-1611	10TS-S10
C23	150 10%		DI-150	DD-151	L10T15	CCD-151	GP315	10TS-T15
C24	225 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C25	225 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C26	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C27	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C28	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C29	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C30	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C31	850 10%		DI-820	DD-821		CCD-821	GP382	10TS-T82
C32	2700 10%		DI-2700		5R5T27	CCD-272	GEM-1625	10TS-D27
C33	600 10%		DI-680	DD-601	1R5T6	CCD-681	GP360	10TS-T60
C34	.25 200V		P288N-25		CUB2P25	2DP-4-254	GEM-2025	2TM-P25
C35	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C36	1200 10%		DI-1200	DD-122	1R5D12	CCD-122	GP212	10TS-D12
C37	.1 400V 10%		V84C4P1-10%		PM4P1	4DP-3-104		4TM-P1
C38	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C39	1200 10%		DI-1200	DD-122	1R5D12	CCD-122	GP212	10TS-D12
C40	.1 400V 10%		V84C4P1-10%		PM4P1			4TM-P1

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C41	10000 10%		DI-10000		PM6S1	CCD-103	GEM-1611	10TS-S10
C42	150 10%		DI-150	DD-151	L10T15	CCD-151	GP350	10TS-T15
C43	225 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C44	225 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C45	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C46	25000				ST6S25	6DP-3-253	GEM-6125	5HK-S25
C47	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C48	.03 600V		P688N-03	DD-303	CUB6S3	6DP-3-303	GEM-613	6TM-S3

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA EICO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250K		18046	AB-51	AD47-250K-2		FA254A	Level, Channel 1
B	250K			SR-51	Not Req.		RU254	Level, Channel 2
C	Shaft			AK-8	RS-3/16		DS37 *	
R2A	500K		18045	AB-59	AD47-500K-2		FB55L	Focus, Channel 1 (Balance)
B	500K			SR-59	Not Req.		RU55U	Focus, Channel 2 (Balance)
C	Shaft			AK-8	RS-3/16		DS37 *	
R3A	1meg		18048	F1-51		† QJ-1148R	■ UE4086	Bass, Channel 1
B	1meg			R2-51				Bass, Channel 2
R4A	500K		18047	F3-42		‡		Treble, Channel 1
B	250K tap 500K			R4-42				Treble, Channel 2
C	250K tap Switch			KR-1				Power, Off-On
R5A	100Ω	2(WW)	19009	WN-101	A43-100	W11-084	R100L	Hum Adjust
B	Shaft			Not Req.	FKS-1/4	SK5	Not Req.	

† "Concentrikit" Equivalent: K-15 Kit with base elements & shafts: B11-137, P13-116 (Panel)
Not available as a factory assembled unit. B11-137, R1-126 (Rear)
‡ "Concentrikit" Equivalent: K-15 Kit with base elements & shafts: B19-133X, P13-116 (Panel)
B19-133X, R1-126 (Rear)
76-1 (Switch)

■ "STA-LOC" Equivalent: FA16L, RU16L, OS1500A, LS1875.
* Use CS687 bushing.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R6	100K	
R7	90K 5%	
R8	100K 5%	
R9	2.2meg 5%	
R10	10K	
R11	1meg	
R12	200K 5%	
R13	2200Ω	
R14	1meg	
R15	200K	
R16	4700Ω	
R17	68K	
R18	330K	
R19	6800Ω	
R20	150K	
R21	1800Ω	
R22	100K	
R23	3300Ω	
R24	470K	
R25	10K	
R26	1800Ω 5%	

ITEM No.	RATING	REMARKS
R27	100K 5%	
R28	100K 5%	
R29	10K	
R30	330K	
R31	10K	
R32	330K	
R33	165Ω 5% 5W	
R34	22K 5%	
R35	100K	
R36	90K 5%	
R37	100K 5%	
R38	2.2meg 5%	
R39	10K	
R40	1meg	
R41	200K	
R42	2200Ω	
R43	1meg	
R44	200K 5%	
R45	4700Ω	
R46	68K	
R47	330K	

ITEM No.	RATING	REMARKS
R48	6800Ω	
R49	150K	
R50	1800Ω	
R51	100K	
R52	3300Ω	
R53	470K	
R54	10K	
R55	1800Ω	
R56	100K 5%	
R57	100K 5%	
R58	10K	
R59	330K	
R60	10K	
R61	330K	
R62	165Ω 5% 5W	
R63	68K	
R64	22K 1W	
R65	4700Ω 2W	
R66	350Ω 10W	
R67	22K 5%	

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	EICO PART No.	REPLACEMENT DATA
K1	Tone Compensator	330mmf, (2) 4700mmf, 1000Ω, (2) 100K, 120K	29751	Sprague TC-24
K2	Tone Compensator	330mmf, (2) 4700mmf, 1000Ω, (2) 100K, 120K	29751	Sprague TC-24

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			EICO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V	91000	97800	312002	341001	AGC 2	HKP-CC

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	EICO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ 1.2A	560VCT @ .150A	6.3V @ 1.8A	30021						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 5.4A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	EICO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7500Ω CT	32Ω Tap @ 16Ω, 8Ω, 4Ω	32013							
T3	7500Ω CT	32Ω Tap @ 16Ω, 8Ω, 4Ω	32013							

MISCELLANEOUS

ITEM No.	PART NAME	EICO PART No.	NOTES
M2	Switch	60057	Input Selector (Rotary Wafer Type)
M3	Switch	60065	Function Selector (Rotary Type)
M4	Switch	62000	Tape (DPDT, Slide Type)
M5	Switch	62002	Speaker Selector (SPDT, Slide Type)

CABINETS & CABINET PARTS

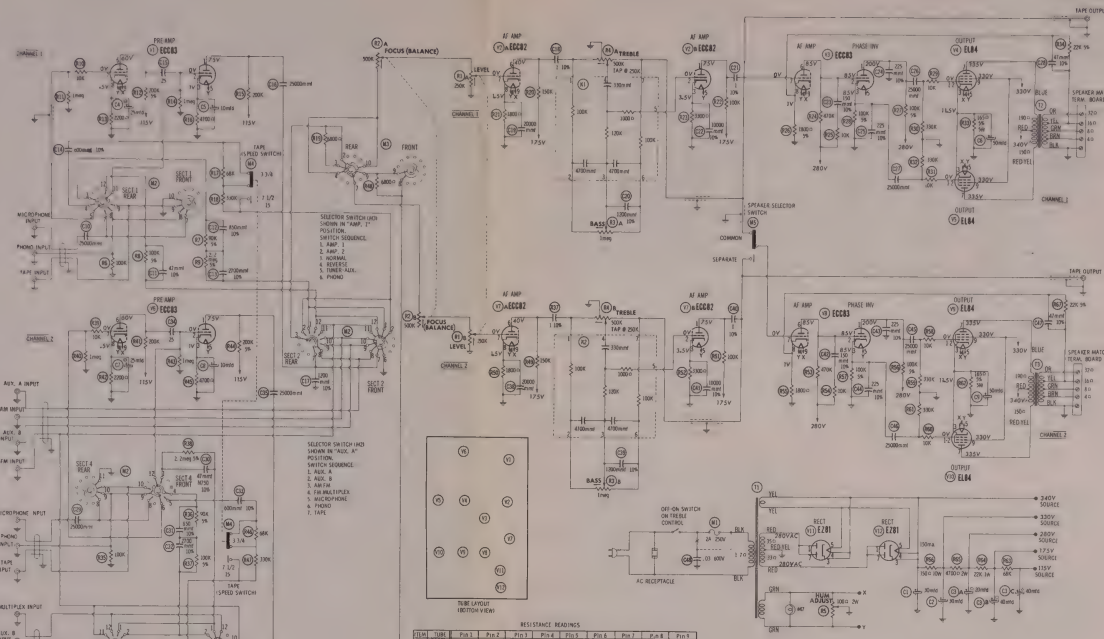
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	53018	Input Selector, Function Selector, Level, Focus
Knob	53017	Amp. 1, Bass, Treble
Knob	53016	Amp. 2, Off-On, Bass

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



RESISTANCE READINGS

TUBE	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83	1.795K	1meg	470Ω	25Ω	25Ω	1.795K	1meg	220Ω	25Ω
V2	ECC83	1.125K	330K	1300Ω	25Ω	25Ω	1.125K	0Ω	180Ω	25Ω
V4	ECC82	1.125K	1.475K	100K	25Ω	25Ω	1.475K	250K	180Ω	25Ω
V5	6BQ5	340K	340K	165Ω	25Ω	25Ω	NC	1.190Ω	TP	1.190Ω
V3	6BQ5	340K	340K	165Ω	25Ω	25Ω	NC	1.190Ω	TP	1.190Ω
V9	ECC83	1.795K	1meg	470Ω	25Ω	25Ω	1.795K	1meg	220Ω	25Ω
V10	ECC82	1.125K	330K	1300Ω	25Ω	25Ω	1.125K	0Ω	180Ω	25Ω
V8	ECC83	1.125K	1.475K	100K	25Ω	25Ω	1.475K	250K	180Ω	25Ω
V6	6BQ5	340K	340K	165Ω	25Ω	25Ω	TP	1.190Ω	TP	1.190Ω
V12	6BQ5	340K	340K	165Ω	25Ω	25Ω	TP	1.190Ω	NC	1.190Ω
V11	EZ81 6CA4	35Ω	NC	1	1	1	NC	35Ω	NC	NC
V13	EZ81 6CA4	35Ω	NC	1	1	1	NC	35Ω	NC	NC

1 THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V12.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

DC COIL RESISTANCE VALVES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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EICO
MODEL HF-81

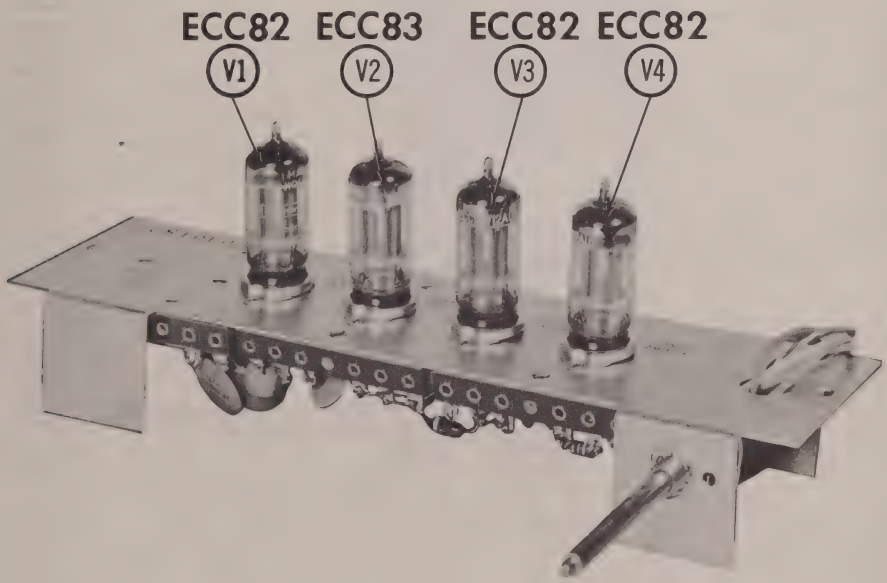
PHOTOFACT® Folder

**HARMAN-KARDON
MODEL MA-350**

HARMAN-KARDON
MODEL MA-350

TRADE NAME	Harman-Kardon Model MA350
MANUFACTURER	Harman-Kardon, Inc., 520 Main Street, Westbury, L. I., N. Y.
TYPE SET	Externally Powered 4 Tube Multiplex Adapter

HARMAN-KARDON
MODEL MA-350



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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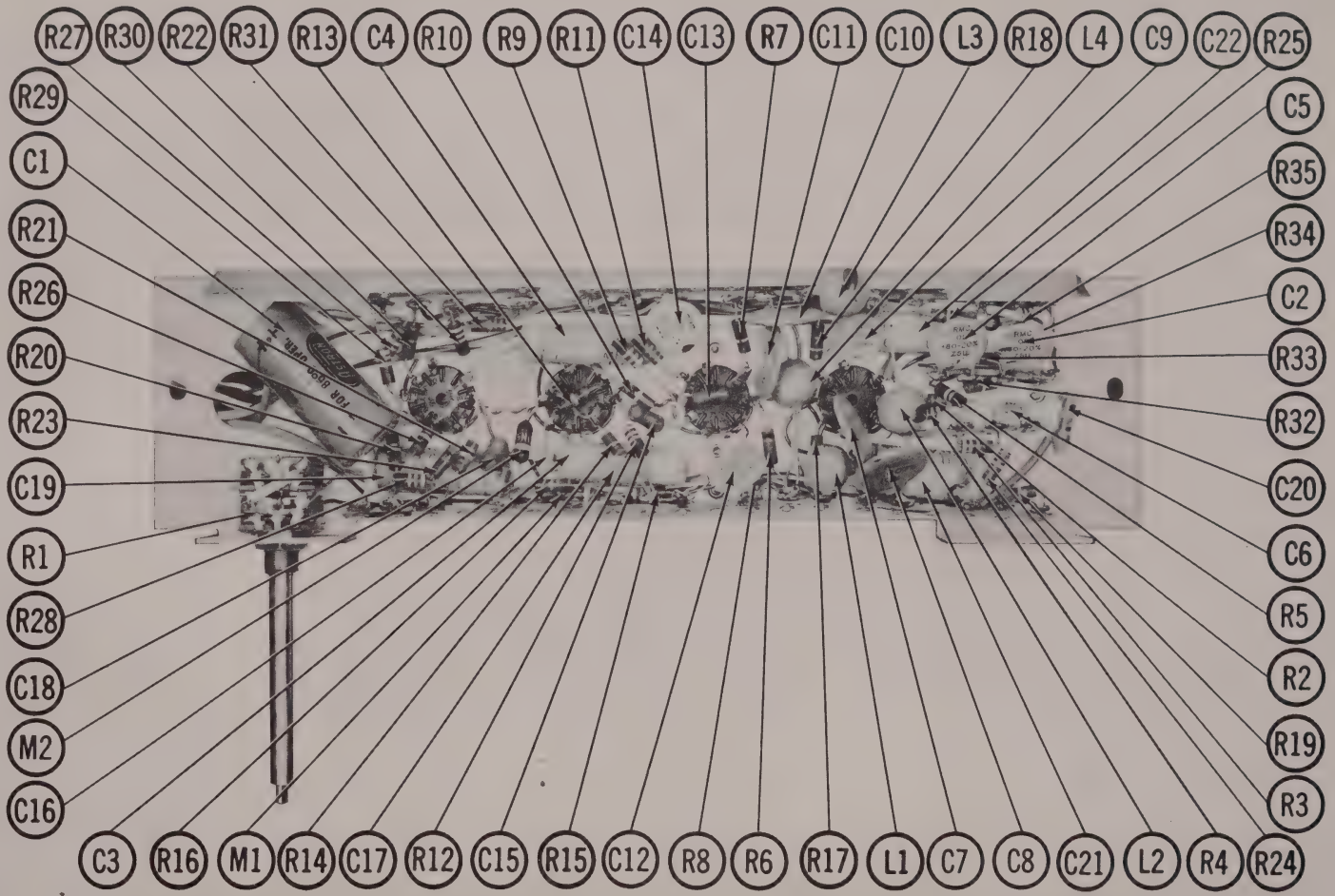


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (CBS / GENERAL ELECTRIC / RAYTHEON / SYLVANIA)
V1	Sub Carrier Cathode Follower-Matrix Amp.	ECC82/12AU7A
V2	Sub Carrier Amplifier	ECC83/12AX7
V3	Sub Carrier Amplifier	ECC82/12AU7
V4	Left Channel Output-Right Channel Output	ECC82/12AU7A

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	10	350		PRS1620	BR1045	TC62	TD-10-450	TVA-1604	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C3	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C4	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C5	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C6	100 N150					*		10TCP-T10
C7	7500 10%		DI-7500			6DP-2-752	GEM-16275	10TS-D75
C8	7500 10%		DI-7500			6DP-2-752	GEM-16275	10TS-D75
C9	3000 10%		DI-3000		PM6D3	CCD-302	GEM-1623	10TS-D30
C10	7500 10%		DI-7500			6DP-2-752	GEM-16275	10TS-D75
C11	7500 10%		DI-7500			6DP-2-752	GEM-16275	10TS-D75
C12	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C13	1000		SI 1000	D6-102	BYA10D1	CCD-102	GP210	5HK-D10
C14	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C15	1000		SI 1000	D6-102	BYA10D1	CCD-102	GP210	5HK-D10
C16	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-447	CN7-447	10TCU-Q47
C17	330		BPD-00033	DD-331	L10T33	CCD-331	GP333	10TS-T33
C18	1000		SI 1000	D6-102	BYA10D1	CCD-102	GP210	5HK-D10
C19	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C20	1000 10%			DD-102	1R5D1	CCD-102	GP210	10TS-D10
C21	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C22	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

* Not normally in distributor' stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	1/2	RVCOM3247-8					Dimension Note 1
B	500K	1/2						Dimension Note 1

Note 1. Some versions may use Part #RV2643138.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	330K	
R3	470K	
R4	4700Ω	
R5	100K	
R6	1000Ω	
R7	100K	
R8	2200Ω	
R9	470K	
R10	100K	
R11	2200Ω	
R12	470K	
R13	10K	

ITEM No.	RATING	REMARKS
R14	2700Ω	
R15	33K	
R16	82K	
R17	2700Ω 5%	
R18	2700Ω 5%	
R19	100K 5%	
R20	100K 5%	
R21	220K	
R22	47K	
R23	1000Ω	
R24	68K	
R25	100K 5%	

ITEM No.	RATING	REMARKS
R26	100K 5%	
R27	220K	
R28	470K	
R29	47K	
R30	1000Ω	
R31	2200Ω	
R32	220K	
R33	10K	
R34	100Ω	
R35	100Ω	

COILS (RF-IF)

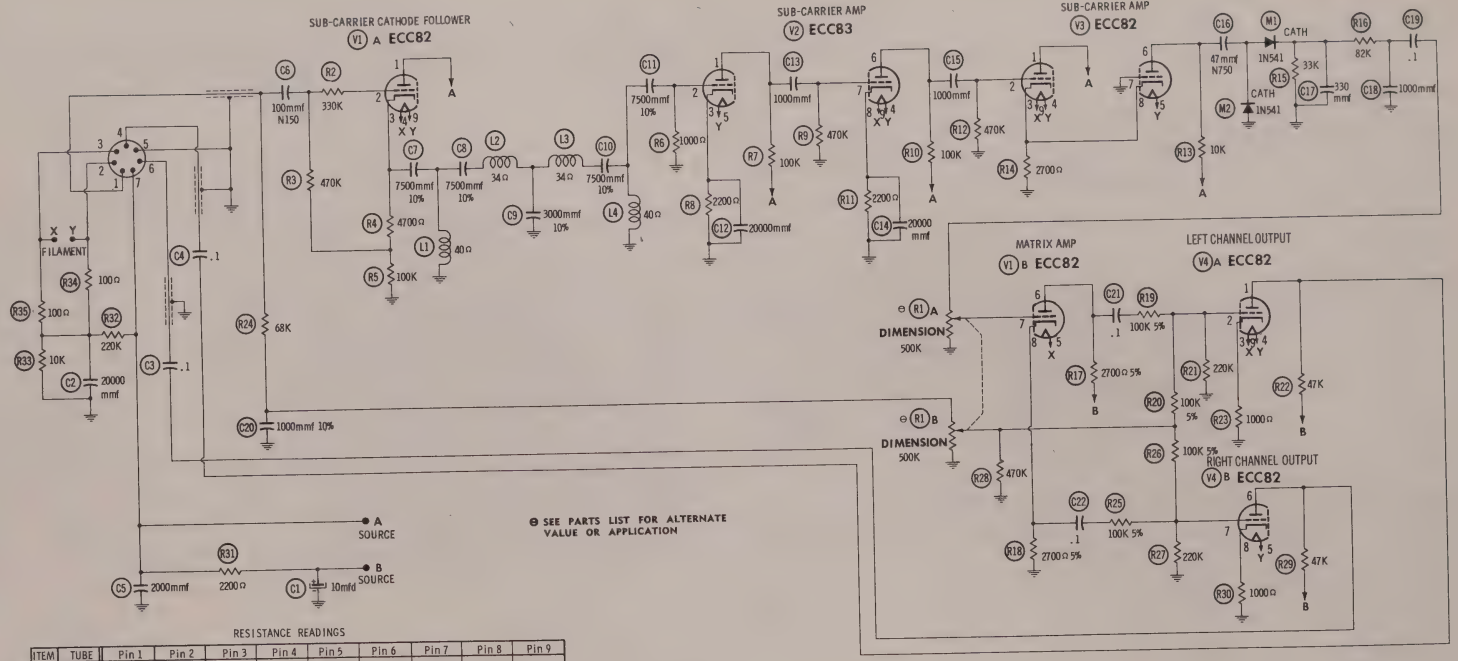
ITEM No.	USE	REPLACEMENT DATA Harman-Kardon PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	RF Choke		19-1042	19-1042	BC-523	4668		4MH
L2	RF Choke		19-1041	19-1041	BC-514	4664		1.6MH
L3	RF Choke		19-1041	19-1041	BC-514	4664		1.6MH
L4	RF Choke		19-1042	19-1042	BC-523	4668		4MH

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA Harman-Kardon PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M1	1N541		1N295	1N295	1N295	Multiplex Det. (Pigtail)
M2	1N541		1N295	1N295	1N295	Multiplex Det. (Pigtail)

WIRING DATA

General-use Unshielded Hook-up Wire ..... **Use BELDEN No. 8530 (Solid) Available in Ten Colors**
8524 (Stranded) Available in Ten Colors



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC82 12AU7	†0Ω	990K	100K	10K	10K	†4900Ω	0Ω	2700Ω	10K
V2	ECC82 12AU7	†100K	1000Ω	2200Ω	10K	10K	†100K	470K	2200Ω	10K
V3	ECC82 12AU7	†0Ω	470K	2700Ω	10K	10K	†10K	0Ω	2700Ω	10K
V4	ECC82 12AU7	†49K	100K	1000Ω	10K	10K	†49K	100K	100Ω	10K

† MEASURED FROM JUNCTION OF R31 AND R32.

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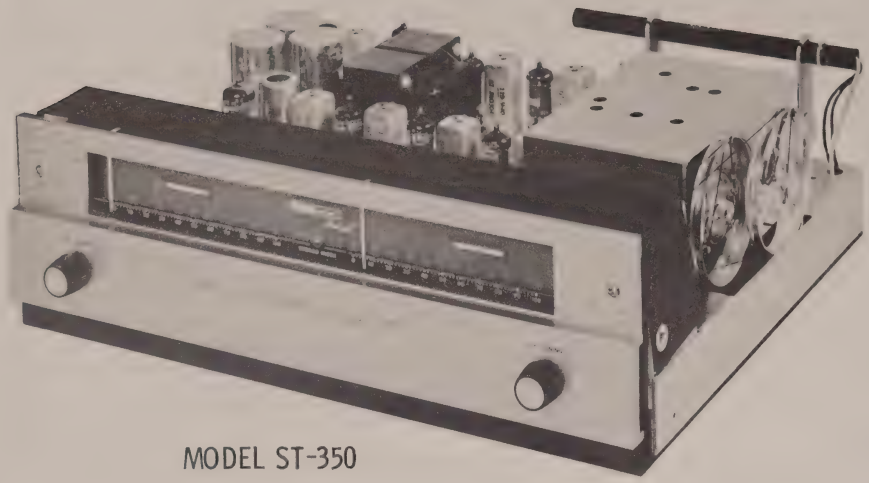
HARMAN-KARDON
MODEL MA-350

PHOTOFACT® Folder with CIRCUITRACE®

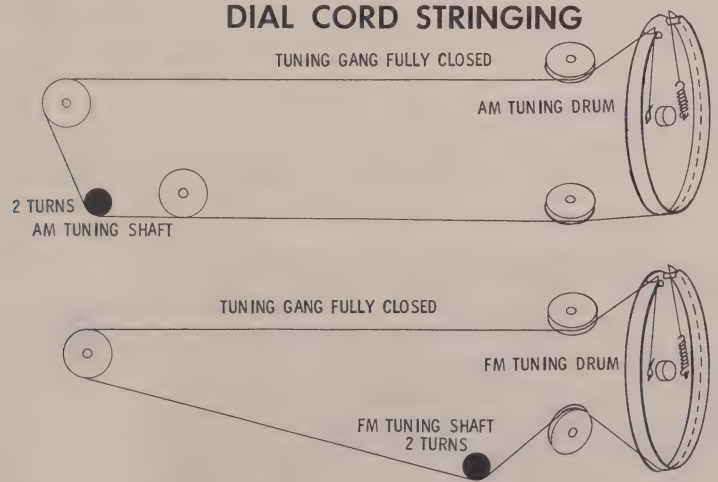
HARMAN-KARDON
MODELS ST-350, ST-360



MODEL ST-350

TRADE NAME	Harman-Kardon Models ST-350, ST-360 (The Madrigal)		
MANUFACTURER	Harman-Kardon, Inc., 520 Main Street, Westbury, L. I., N. Y.		
TYPE SET	AC Operated 16 Tube FM-AM Tuner		
POWER SUPPLY	105-125 Volts AC, 60 Cycles	RATING	51 Watts, .5 Amp. @ 117 Volts AC
TUNING RANGE	BROADCAST 530 - 1640KC	FREQ. MOD.	88 - 108MC

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JL601

SET 481 FOLDER 7

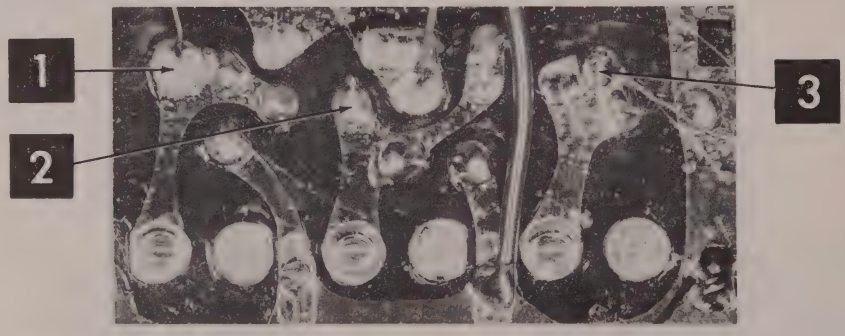
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CY5	.1Ω	68Ω	.2Ω	0Ω	▲1700Ω	▲ 35K	68Ω		
V2	6BC5	3.3meg	0Ω	0Ω	.2Ω	▲ 1000Ω	▲ 1000Ω	0Ω		
V3	6BK7B	▲ 1700Ω	22K	.1Ω	0Ω	.2Ω	▲ 660Ω	3.6meg ■ 4.7meg	1000Ω	0Ω
V4	6AU6	.6Ω	0Ω	.2Ω	0Ω	▲ 1000Ω	▲ 1000Ω	120Ω		
V5	6AU6	.6Ω	0Ω	.2Ω	0Ω	▲ 1000Ω	▲ 1000Ω	120Ω		
V6	6AU6	100K	0Ω	.2Ω	0Ω	▲ 11K	▲ 11K	120Ω		
V7	EM84	1.8meg	† 2000Ω	0Ω	0Ω	.1Ω	† 2000Ω	† 470K	† 2000Ω	† 470K
V8	6BN6	220Ω	.6Ω	0Ω	.2Ω	† 25K	3300Ω	† 24K		
V9	6AL5	0Ω	180K	.1Ω	0Ω	360K	0Ω	180K		
V10	6BA6	▬ 2.5meg	0Ω	0Ω	.1Ω	▲▬1000Ω	▲▬ 1000Ω	120Ω		
V11	6BE6	22K	.5Ω	0Ω	.1Ω	▲▬ 1000Ω	▲▬ 1000Ω	▬ 2.5meg		
V12	6BA6	▬ 1.5meg	0Ω	0Ω	.1Ω	▲▬ 1000Ω	▲▬ 1000Ω	0Ω		
V13	6BA6	▬ 1.5meg	0Ω	.1Ω	0Ω	▲▬ 1000Ω	▲▬ 1000Ω	0Ω		
V14	ECC82	† 17K	9Ω	82K	.1Ω	.1Ω	† 100K	22K	1500Ω	0Ω
V15	EM84	1meg	† 2000Ω	0Ω	0Ω	.1Ω	† 2000Ω	† 470Ω	† 2000Ω	† 470Ω
V16	ECC82	660Ω	550K ♦ 1.1meg	105K	.1Ω	.1Ω	▲660Ω	550K ♦ 1.1meg	105K	0Ω

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.

† MEASURED FROM OUTPUT OF M2.
▬ MEASURED IN "AM" POSITION.
■ MEASURED IN "FM-AFC" POSITION.
▲ MEASURED FROM JUNCTION OF R57 AND C2A.
♦ MEASURED IN "STEREO AM-FM" POSITION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.



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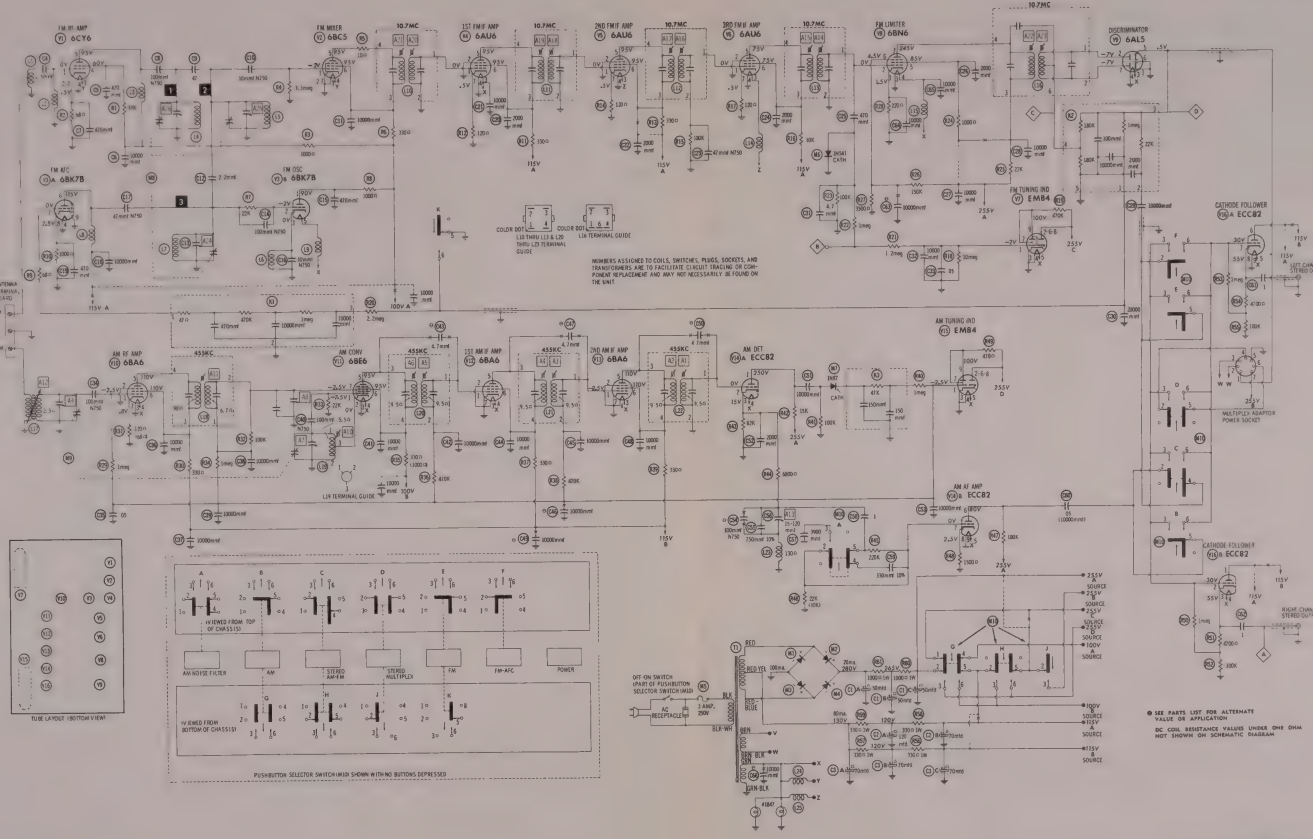
*TRADE MARK

PRINTED BOARD


FM RF AMP V1 6CY6
FM MIXER V2 6BC5
10.7MC
1ST FMIF AMP V4 6AU6
2ND FMIF AMP V5 6AU6
3RD FMIF AMP V6 6AU6
FM LIMITER V8 6BN6
DISCRIMINATOR V9 6AL5
FM AFC V3 6BK7B
FM OSC V3 6BK7B
FM TUNING IND V7 EM84
CATHODE FOLLOWER V10A ECC82
LEFT CHANNEL STEREO OUTPUT
AM RF AMP V10 6BA6
AM CONV V11 6BE6
455KC
1ST AMIF AMP V12 6BA6
2ND AMIF AMP V13 6BA6
AM DET V14A ECC82
AM TUNING IND V15 EM84
AM AF AMP V14B ECC82
CATHODE FOLLOWER V15B ECC82
RIGHT CHANNEL STEREO OUTPUT
ANTENNA TERMINAL BOARD
MULTIPLEX ADAPTOR POWER SOCKET
COLOR DOT L1 THRU L13 & L20 THRU L23 TERMINAL GUIDE
COLOR DOT L14 THRU L19 TERMINAL GUIDE
L1A TERMINAL GUIDE
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT
TUBE LAYOUT (BOTTOM VIEW)
VIEWED FROM TOP OF CHASSIS
VIEWED FROM BOTTOM OF CHASSIS
AM NOISE FILTER
AM
STEREO AM-FM
STEREO MULTIPLEX
FM
FM-AFC
POWER
PUSHBUTTON SELECTOR SWITCH (MAIN SHOWN WITH NO BUTTONS DEPRESSED)
OFF-ON SWITCH (PART OF PUSHBUTTON SELECTOR SWITCH (MAIN))
AC RECEPTACLE
3 AMP. 250V
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUIT ACE
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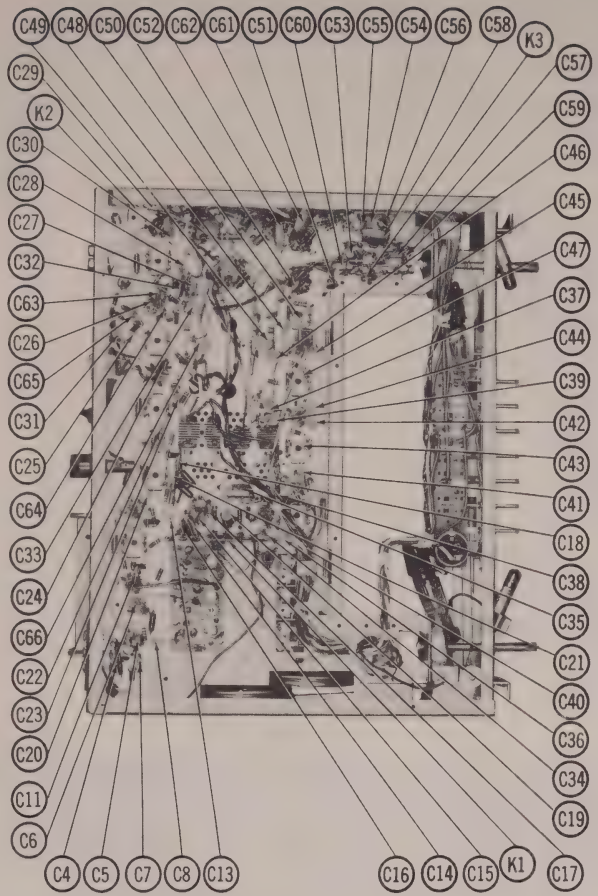
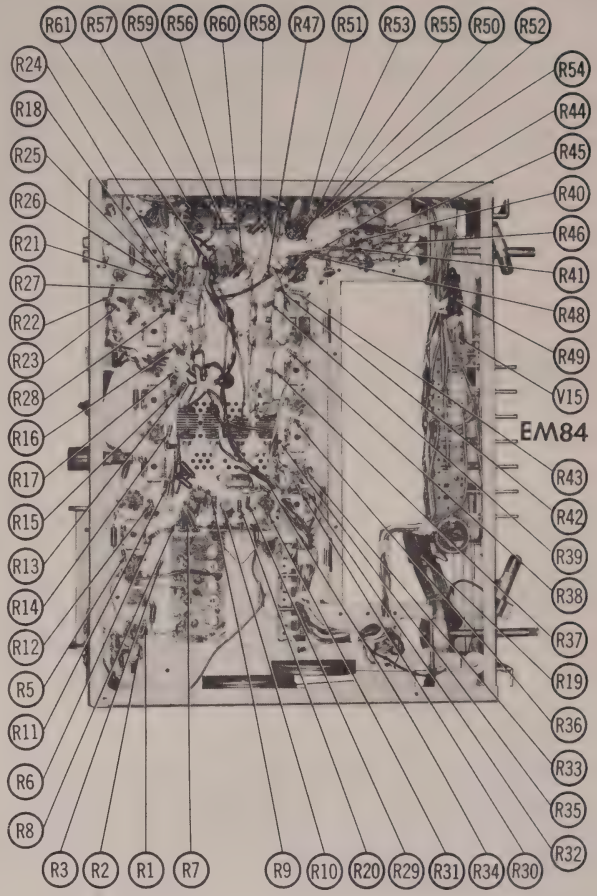
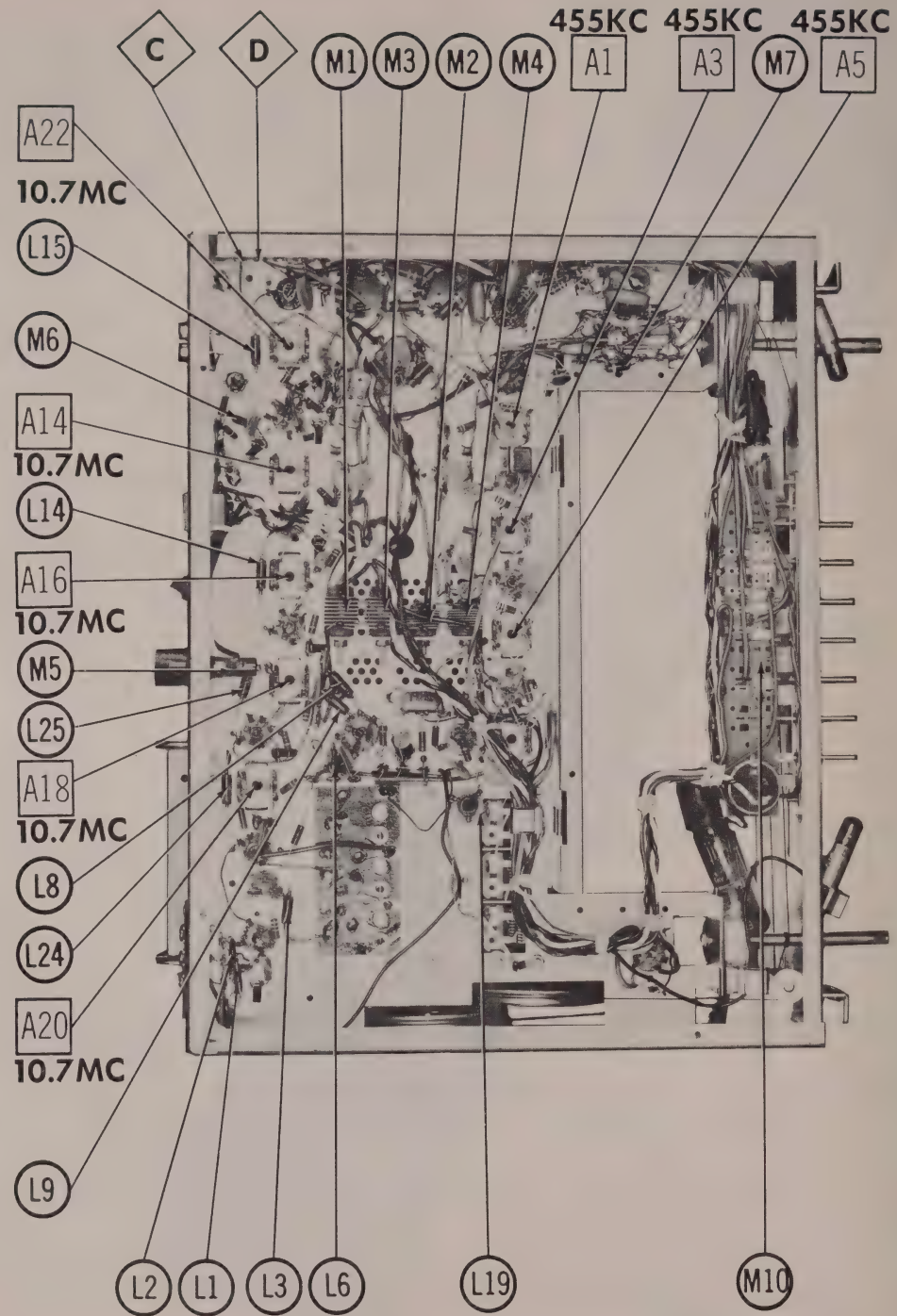


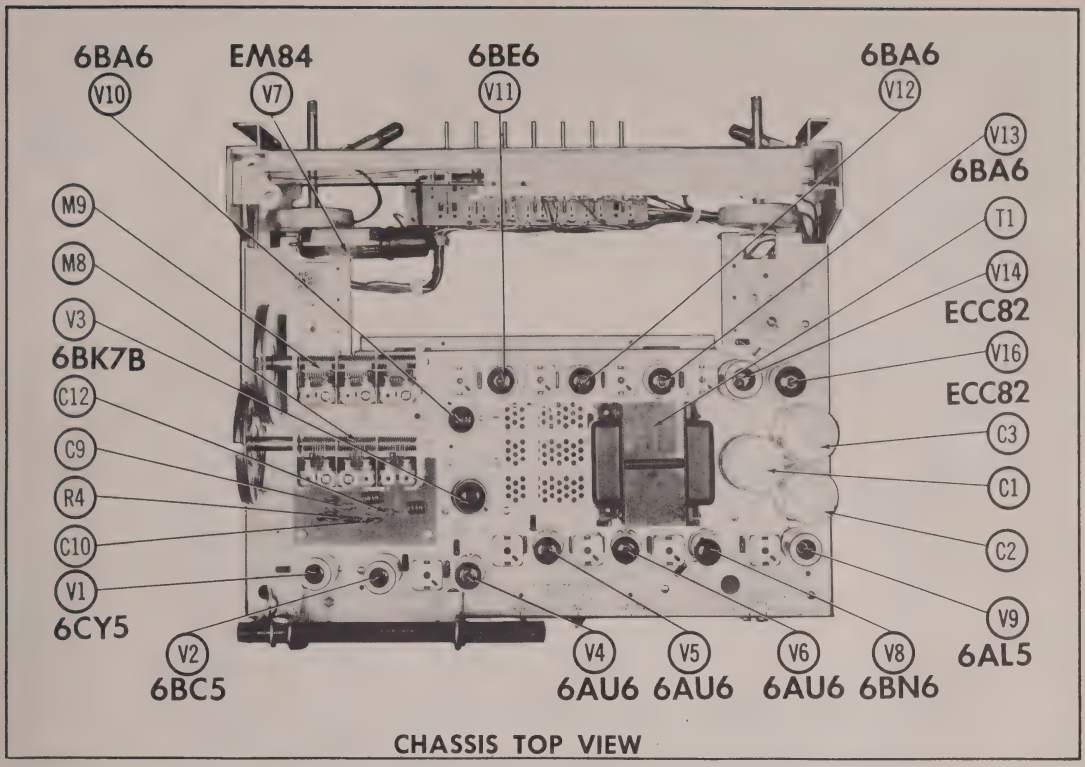
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



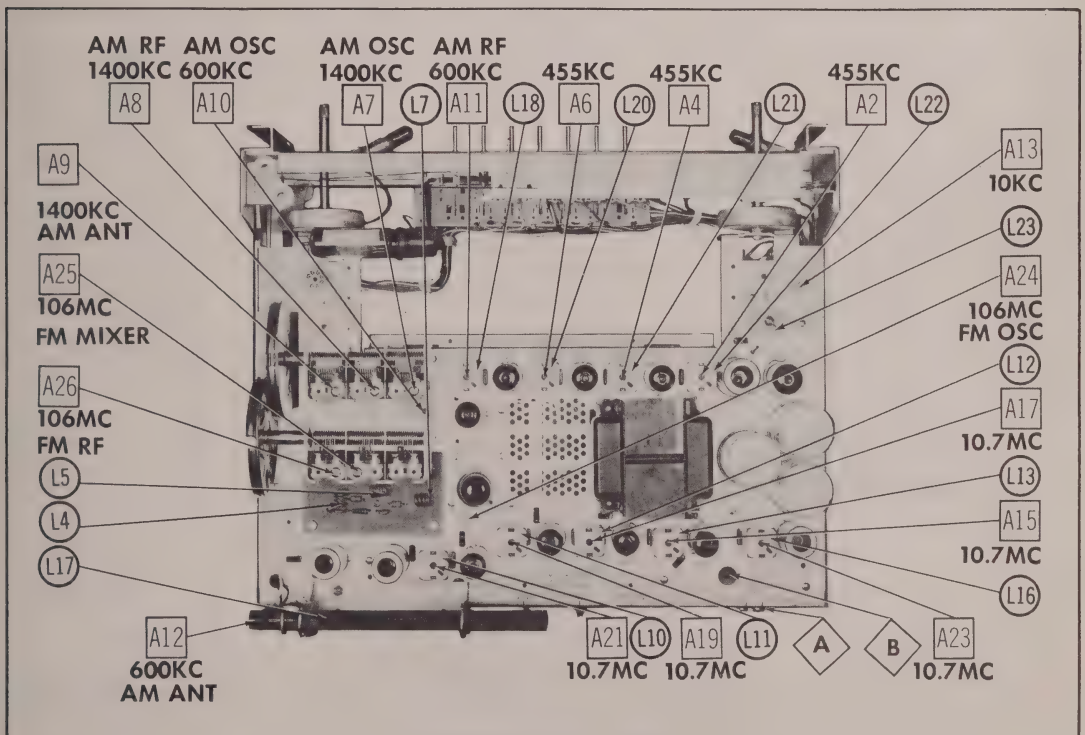
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW - ALIGNMENT, INDUCTOR & MISC. IDENT.



CHASSIS TOP VIEW



CHASSIS TOP VIEW

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use only enough generator output to provide a usable indication on VTVM.
Suggested Alignment Tools: A1 thru A6, A11, A14 thru A23 ..... GENERAL CEMENT #5097, 8727
WALSCO #2515
A7, A8, A9, A24, A25, A26 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A10 ..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2528, 2543, 2544, 2545
A13 ..... GENERAL CEMENT #8721, 8722
WALSCO #2519

AM ALIGNMENT - SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to AM RF stator lug of AM tuning gang. Low side to chassis.	455KC (400~ 30% AM)	AM tuning gang fully open	AC probe to point (A). Common to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection.
2.	High side thru .01mfd to AM antenna terminal. Low side to chassis.	1400KC	1400KC	"	A7, A8, A9	"
3.	"	600KC	600KC	"	A10, A11, A12	Adjust for maximum deflection. Repeat step 2.
4.	Same as Step 1.	455KC (10KC 30% AM)	1600KC	"	A13	Adjust for MINIMUM deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .001mfd to FM RF stator lug of tuning gang. Low side to chassis.	10.7MC (Unmod.)	FM point of non-interference	DC probe to point (B). Common to chassis.	A14, A15, A16, A17, A18, A19, A20, A21	Adjust for maximum deflection.
6.	"	"	"	DC probe thru 1meg to point (C). Common to chassis.	A22	"
7.	"	"	"	DC probe to point (D). Common to chassis.	A23	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .001mfd to FM RF stator lug of FM tuning gang. Low side to chassis.	10.7MC (450KC swp)	FM point of non-interference	Vert. Amp. to point (B). Common to chassis.	A14, A15, A16, A17, A18, A19, A20, A21	Adjust for maximum gain and symmetry of response similar to Fig. 1.
6.	"	"	"	Vert. Amp. thru 27K to point (C). Low side to chassis.	A22	"
7.	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A23	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A22 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	106MC (Unmod.)	FM 106MC	DC probe to point (B). Common to chassis.	A24, A25, A26	Adjust for maximum deflection.
9.	"	90MC	90MC	"	L7, L5, L4	"

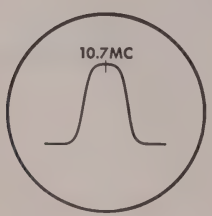


FIG. 1

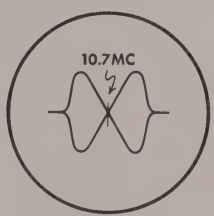


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	FM RF Amplifier	6CY5
V2	FM Mixer	6BC5
V3	FM AFC - FM Osc.	6BK7B
V4	1st FM IF Amplifier	6AU6
V5	2nd FM IF Amplifier	6AU6
V6	3rd FM IF Amplifier	6AU6
V7	FM Tuning Indicator	EM84
V8	FM Limiter	6BN6
V9	Discriminator	6AL5
V10	AM RF Amplifier	6BA6
V11	AM Converter	6BE6
V12	1st AM IF Amplifier	6BA6
V13	2nd AM IF Amplifier	6BA6
V14	AM Det. - AM AF Amp.	ECC82 (12AU7) *
V15	AM Tuning Indicator	EM84
V16	Cathode Follower	ECC82 (12AU7) *

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲50	300	JE2923271A	AFH4-02-10	D022			TVLS-3580.7*	
B	■50	300							
C	▬50	300							
C2A	▬120	200	JE2923273A	AFHS2-24-20	XB0194	FP335	TMT-15	TVL-2464	
B	▲70	150							
C3A	■70	150	JE2923272A	AFH3-21	XC0123		TMQ-34	TVL-3446	
B	▲70	150							
C	▬70	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	1.5		NPO-SI 1.5	TCZ-1R5	C10V15C		CNO-515	10TCC-V15
C5	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TS-T47
C6	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C7	470		BPD-00047	DD-471	BYA10SI	CCD-471	GP347	10TS-T47
C8	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C9	.47		NPO-SL 5	TCZ-R5				
C10	10 N750		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10
C11	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C12	2.2		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C13								
C14	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C15	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TS-T47
C16	10 N750		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10
C17	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C18	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C19	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TS-T47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C20	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C21	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C22	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C23	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C24	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C25	470		BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TS-T47
C26	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C27	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C28	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C29	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C30	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C31	4.7		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CN7-547	10TCC-V47
C32	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C33	.05 200V		P288N-05	DD-503	CUB2S5	4DP-3-503	GEM-415	2TM-S5
C34	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CNO-310	10TCU-T10
C35	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C36	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C37	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C38	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C39	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C40	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C41	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C42	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C43	4.7	Note 1	NPO-DI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-547
C44	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C45	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C46	10000	Note 1	BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C47	4.7	Note 1	NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C48	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C49	10000	Note 1	BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C50	4.7	Note 1	NPO-SI 417	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C51	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C52	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C53	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C54	100 N750	Note 1	N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C55	750 10%		DI-750	DD-751	1R5T75	CCD-751	GP375	10TS-T75
C56	15-120	#JVCOM3335				302-M		
C57	3900		SI 4000	DD-392	L10D39	CCD-392	GP239	10TS-D39
C58	.1 400V		P488N-1	DF-104	CUB4P1	4P1-3-104	GEM-401	4TM-P1
C59	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C60	.05 400V	(10000mmf) *	P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C61	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C62	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C63	10000	Note 1	BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C64	10000		BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C65	10000	Note 1	BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10
C66	10000	Note 1	BPD-01	DD-103	BYA10SI	CCD-103	GP110	5HK-S10

Note 1. Not used in some versions. # Harman-Kardon Part Number. * Alternate Value.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	33K	
R2	68Ω	
R3	1000Ω	
R4	3.3meg	
R5	10Ω	
R6	330Ω	
R7	22K	
R8	1000Ω	
R9	68Ω	
R10	1000Ω	
R11	330Ω	
R12	120Ω	
R13	330Ω	
R14	120Ω	
R15	100K	
R16	10K	
R17	120Ω	
R18	10meg	
R19	470K	
R20	2.2meg	
R21	1.2meg	
R22	1meg	
R23	100K	
R24	1000Ω	
R25	22K	
R26	150K	
R27	3300Ω	
R28	220Ω	
R29	1meg	
R30	330Ω	
R31	120Ω	(68Ω) *
R32	100K	
R33	22K	
R34	1meg	
R35	330Ω	(1000Ω) *
R36	470K	
R37	330Ω	
R38	470K	
R39	330Ω	
R40	1meg	
R41	100K	
R42	15K	
R43	82K	
R44	6800Ω	
R45	220K	
R46	22K	(10K) *
R47	100K	
R48	1500Ω	
R49	470Ω	
R50	1meg	
R51	4700Ω	
R52	100K	
R53	1meg	
R54	4700Ω	
R55	100K	
R56	330Ω 1W	
R57	330Ω 1W	
R58	330Ω 1W	
R59	330Ω 1W	
R60	1000Ω 1W	
R61	1000Ω 1W	

* Alternate Value.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Harman-Kardon PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Antenna Coil	GLCOM3082						2uh
L2	RF Choke	GLCOM3083						
L3	RF Choke							3.3uh
L4	FM RF Coil							
L5	FM Mixer Coil							
L6	Cathode Choke		19-1000	19-1000	BC-561	4602		1uh
L7	FM Osc. Coil							
L8	RF Choke							3.3uh
L9	Fil. Choke							3.3uh
L10	1st FM IF Trans.	GT2503045	16-3487	16-3487	FM-254	1463		
L11	2nd FM IF Trans.	GT2503045	16-3487	16-3487	FM-254	1463		
L12	3rd FM IF Trans.	GT2503045	16-3487	16-3487	FM-254	1463		
L13	4th FM IF Trans.	GT2503045	16-3487	16-3487	FM-254	1463		
L14	Fil. Choke							3.3uh
L15	Fil. Choke							3.3uh
L16	Discriminator	GT2503052	17-3494	17-3494	FM-253	1464		
L17	Loopstick	GL2923276			BC-418 †			
L18	AM RF Trans.	GT2493012						
L19	AM Osc. Coil	STCOM3279				70 OSC		
L20	1st AM IF Trans.	GTCOM3346	16-6758	16-6758	BC-352	12-C1	RF-1	
L21	2nd AM IF Trans.	GTCOM3346	16-6758	16-6758	BC-353	12-C2	RF-2	
L22	3rd AM IF Trans.	GTCOM3346	16-6758	16-6758	BC-353	12-C2	RF-2	
L23	10KC Filter							300MH
L24	Fil. Choke							3.3uh
L25	Fil. Choke							3.3uh

† Use original mounting brackets.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .5A	220VCT @ .100A	6.3V @ 4.5A	FT2923274B						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V Not used									

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Harman-Kardon PART No.	REPLACEMENT DATA
K1	FM AFC Filter	470mmf, 10000mmf, 10000mmf, 47Ω, 470K, 1meg	PCCOM3080	Sprague V-21
K2	Discriminator Network	100mmf, 2000mmf, 10000mmf, 22K, 180K, 180K, 1meg	PCCOM3081	Sprague C-8
K3	AM Detector-Audio Filter	150mmf, 150mmf, 47K	P781599	Aerovox PA-98 Centralab PC-5I Cornell-Dubilier 11TM2 Sprague D-2

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	Harman-Kardon PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.050A	STCOM3270 *	RS065 *	1234AH *	65A*	SR200 ♦	* Selenium Type
M2	.050A	STCOM3270 *	RS065 *	1234AH *	65A*	SR200 ♦	♦ Silicon Type
M3	.010A	1362133 *	RS065 *	1234AH *	65 *	SR200 ♦	
M4	.010A	1362133 *	RS065 *	1234AH *	65 *	SR200 ♦	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Harman-Kardon PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M5	3AG	3A 250V	ZCOM3291	HC33901	312003 (3AG 3A 250V)	342001	AGC3	HKP

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Harman-Kardon PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M6	1N541		1N636	1N295	1N295	FM Tuning Ind. Rect. (Pigtail)
M7	1N87		1N636	1N295	1N295	AM Tuning Ind. Rect. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M8	FM Tuning Cap.	JV2923213	3 Gang
M9	AM Tuning Cap.	JV2923214	3 Gang (Ant. 24-381mmf, RF 20-390mmf, Osc. 15-90mmf)
M10	Switch	2923275	Function (Pushbutton Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

MONITORADIO
MODELS MC-40, MC-160

MONITORADIO
MODELS MC-40, MC-160

MODEL MC-160

MONITORADIO
MODELS MC-40, MC-160

TRADE NAME	Monitoradio Models MC-40, MC-160		
MANUFACTURER	Monitoradio Div., I. D. E. A., Inc., 7900 Pendleton Pike, Indianapolis 26, Indiana		
TYPE SET	Battery Operated 10 Tube Fixed Frequency Mobile Receiver		
POWER SUPPLY	12 Volt Storage Battery	RATING	3 Amp. @ 12.6 Volts DC
TUNING RANGE	Model MC-40: 30-50MC	Model MC-160: 152-174MC	

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JY524

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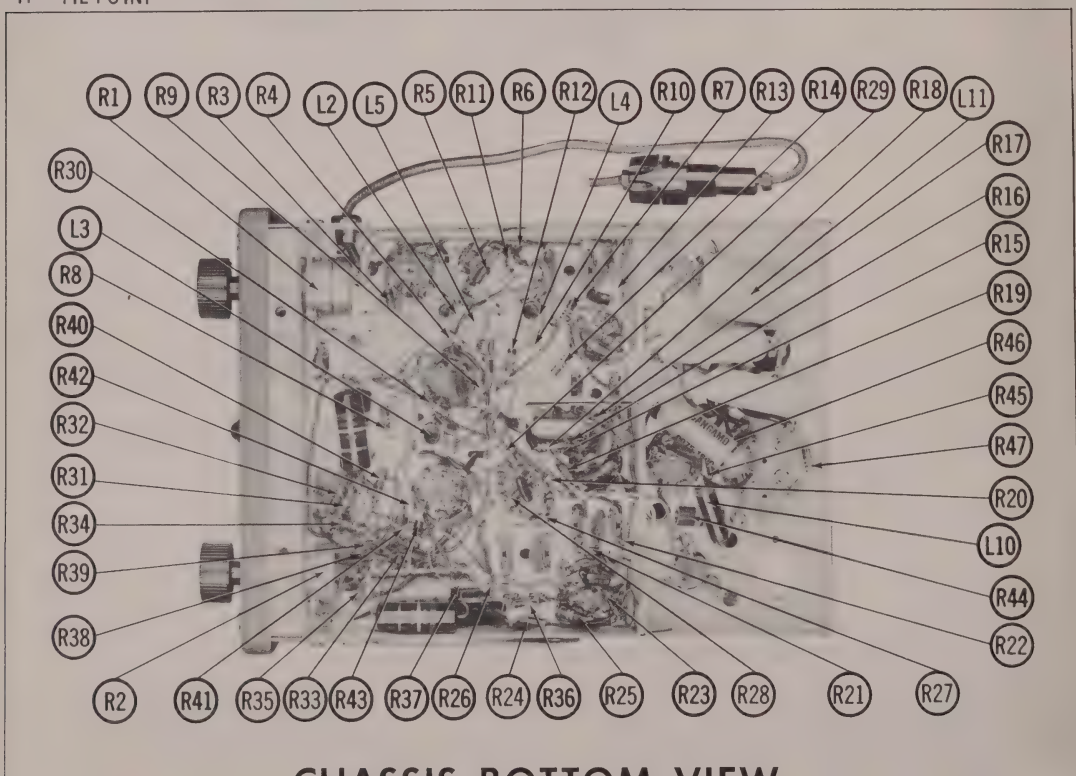
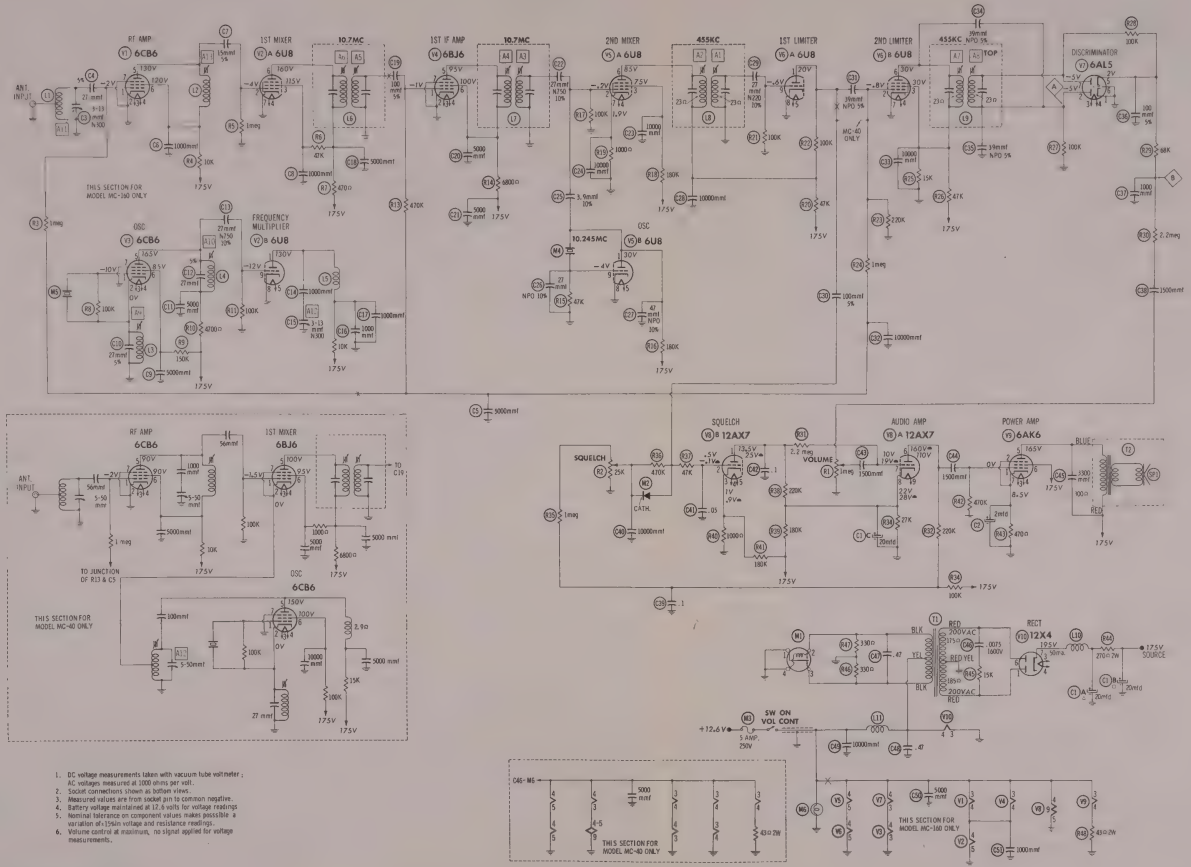
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CB6	2.2meg	0Ω	1Ω	1.5Ω	†10K	†10K	0Ω		
V2	6U8	†10K	1meg	†47K	1.5Ω	0Ω	†740Ω	0Ω	0Ω	100K
V3	6CB6	100K	.1Ω	0Ω	1.5Ω	†5000Ω	†150K	0Ω		
V4	6BJ6	1.7meg	0Ω	1Ω	1.5Ω	†7100Ω	†7100Ω	0Ω		
V5	6U8	†180K	100K	†180K	1Ω	1.5Ω	†47K	1000Ω	0Ω	47K
V6	6U8	†150K	220K	†35K	1.5Ω	0Ω	†35K	0Ω	0Ω	100K
V7	6AL5	0Ω	100K	1.5Ω	1Ω	200K	0Ω	100K		
V8	12AX7	†320K	520K	1000Ω	1Ω	0Ω	†320K	2.5meg	27K	4Ω
V9	6AK6	470K	470Ω	1Ω	6Ω	†600Ω	†270Ω	470Ω		
V10	12AX4	185Ω	TP	0Ω	1Ω	NC	175Ω	¶		

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V10.
- MEASURED WITH SQUELCH CONTROL IN MAXIMUM CLOCKWISE POSITION.
NC NO CONNECTION
TP TIE POINT



CHASSIS BOTTOM VIEW



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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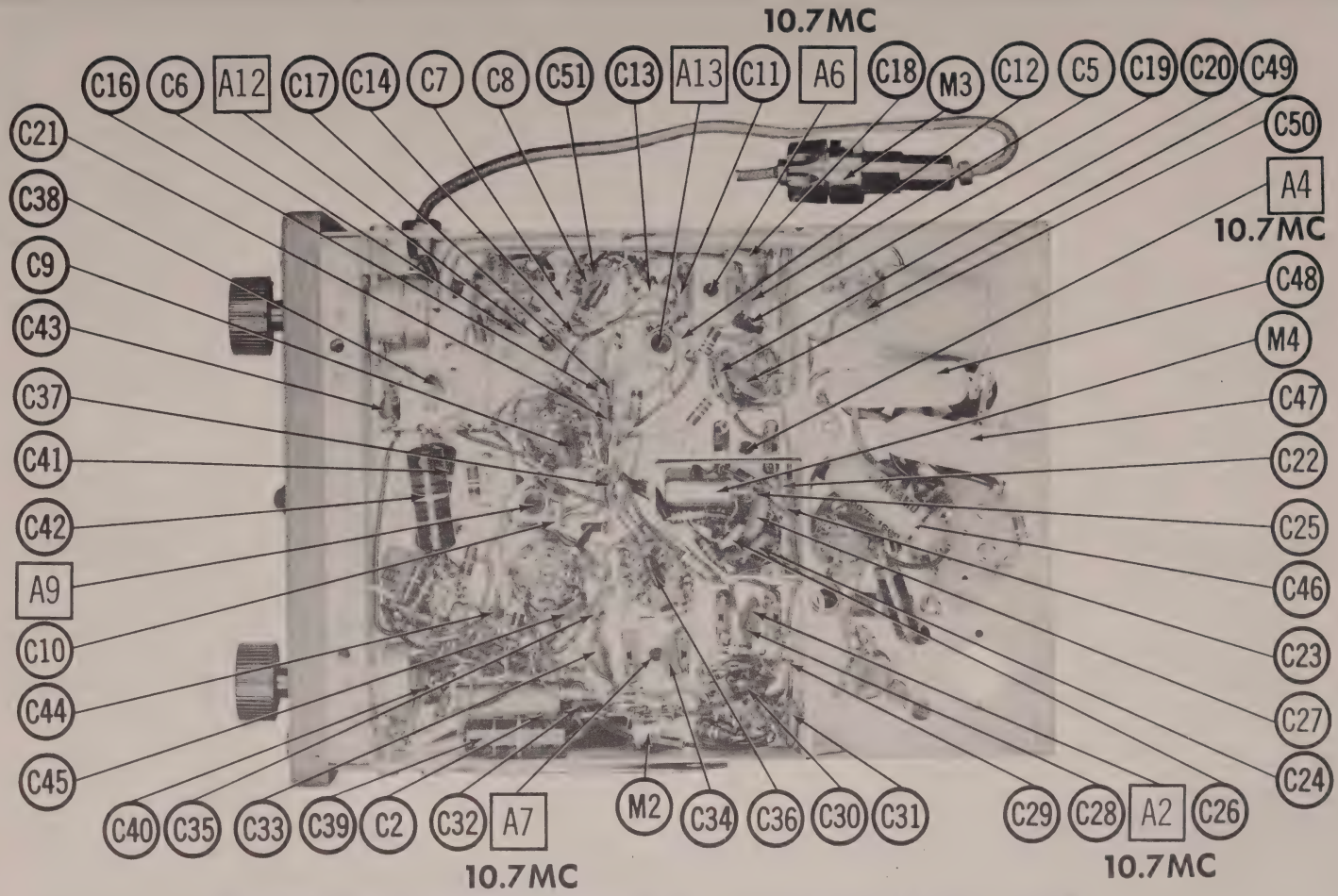
MONITORADIO
MODELS MC-40, MC-160



CHASSIS BOTTOM VIEW - ALIGNMENT, CAPACITOR & MISC. IDENT.

MONITORADIO
MODEL MC-40

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Turn Volume and Squelch fully clockwise.
Use only enough generator output to provide a usable indication on VTVM.
Suggested Alignment Tools: A1 thru A8 ..... GENERAL CEMENT #8282, 8606, 8606L, 9295
WALSCO #2526, 2543, 2544, 2545
A9, A13, A14 (MC-40)..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
A9, A10, A13 (MC-160) WALSCO #2531
A10, A11, A12 (MC-40)..... GENERAL CEMENT #5004, 5008, 5009
A11, A12 (MC-160) WALSCO #2520

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .001mfd to pin 2 (grid) of 1st Mixer. Low side to chassis.	10.7MC (Unmod.)	DC probe thru 1meg to pin 2 of 2nd Limiter. Common to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection.
2.	"	"	DC probe thru 1meg to point (A). Common to chassis.	A7	"
3.	"	"	DC probe to point (B). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CONNECT SCOPE	ADJUST	REMARKS
1.	High side thru .001mfd to pin 2 (grid) of 1st Mixer. Low side to chassis.	10.7MC (450KC Swp)	Vert. Amp. thru 27K to pin 2 of 2nd Limiter. Low side to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum gain and symmetry of response similar to Fig. 1.
2.	"	"	Vert. Amp. thru 27K to point (A). Low side to chassis.	A7	"
3.	"	"	Vert. Amp. to point (B). Low side to chassis.	A8	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

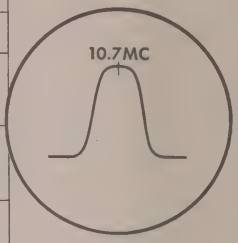


FIG. 1

MC-40 RF ALIGNMENT

Insert crystal of proper frequency.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CONNECT VTVM	ADJUST	REMARKS
4.	Not used	Not used	DC probe thru 1meg to pin 1 of 1st oscillator. Common to chassis.	A9	Adjust for maximum deflection.
5.	High side thru 22Ω to antenna terminal. Low side to ground terminal.	Frequency of desired signal. (Station freq =2 times Xtal freq. - 10.7MC)	DC probe thru 1meg to pin 2 of 2nd Limiter.	A10, A11, A12, A13, A14	Adjust for maximum deflection. If no peak is reached on A11 and/or A12, adjust A13 and/or A14 until a peak is reached. If no peak is reached on A10, compress or expand coil turns of L1 until peak is reached.

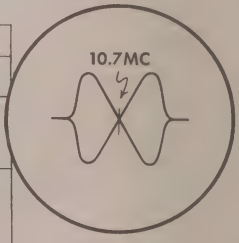


FIG. 2

MC-160 RF ALIGNMENT

Insert crystal of proper frequency.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CONNECT VTVM	ADJUST	REMARKS
4.	Not used	Not used	DC probe thru 1 meg to pin 1 of 1 st oscillator. Common to chassis.	A9	Adjust for maximum deflection.
5.	"	"	DC probe to pin 9 of Frequency Multiplier. Common to chassis.	A10	"
6.	High side thru 22Ω to antenna terminal. Low side to ground terminal.	Frequency of desired signal. (Station freq =6 times Xtal freq. - 10.7MC)	DC probe thru 1meg to pin 2 of 2nd Limiter. Common to chassis.	A11, A12, A13	Adjust for maximum deflection. If no peak is reached on A11 and/or A12, compress or expand coil turns of L1 and/or L5 until peak is reached.

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amplifier	6CB6	V6	1st and 2nd Limiter	6U8
V2	1st Mixer - Freq. Multiplier	6U8	V7	Discriminator	6AL5
V3	1st Osc.	6CB6	V8	AF Amp. - Squelch Amp.	12AX7
V4	1st IF Amp.	6BJ6	V9	Output	6AK6
V5	2nd Mixer - Osc.	6U8	V10	Rectifier	12X4

ELECTROLYTIC CAPACITORS

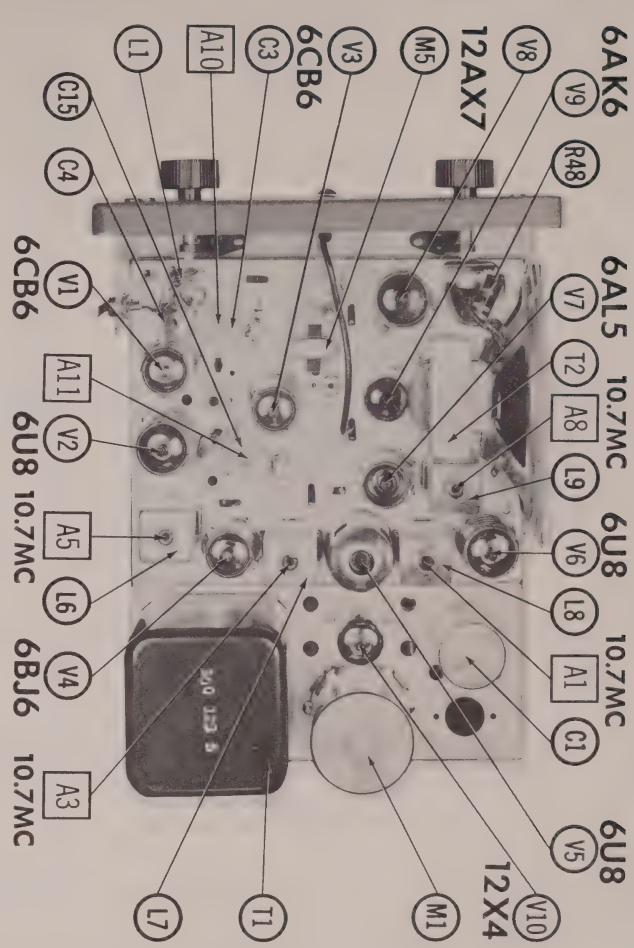
ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Monitoradio PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲20	250	300-082-5	AFH3-97	C0710	FP319.8	TMT-79	TVL-3635	
B	■20	250							
C	20	25							
C2	2	50	300-109-1	PRS1300	BBR2-50	TC302	TD-2-50	TVA-1301	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	3-13	N300								
C4	27		5%		1469-000027	TCZ-27	22R5Q27	CM-19B-270J	CNO-427	MS-427
C5	5000				BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C6	1000				BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C7	15		5%		1469-000015	TCZ-15	22R5Q15	CM-19B-150J	CNO-415	MS-415
C8	1000				BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C9	5000				BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C10	27		5%		1469-000027	TCZ-27	22R5Q27	CM-19B-270J	CNO-427	MS-427
C11	5000				BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C12	27		5%		1469-000027	TCZ-27	22R5Q27	CM-19B-270J	CNO-427	MS-427
C13	27	N750	10%		N750-SI 27	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C14	1000				BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C15	3-13	N300								
C16	1000				BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C17	1000				BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C18	5000				BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C19	100		5%		1469-0001	TCZ-100	22R5T1	CM-19B-101J	CNO-310	MS-31
C20	5000				BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C21	5000				BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C22	27	N750	10%		N750-SI 27	TCN-27	C10Q27U	CCTN-270	CNO-427	10TCU-Q27
C23	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C24	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C25	3.9		10%				C10V4C			10TCC-V39
C26	27	NPO	10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C27	47	NPO	10%		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C28	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C29	27	N220	10%					*		10TCR-Q27
C30	100		5%		1469-0001	TCZ-100	22R5T1	CM-19B-101J	CNO-310	MS-31
C31	39	NPO	5%			TCZ-39	C10Q39C	CM-19B-390J	CNO-439	10TCC-Q39
C32	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C33	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C34	39	NPO	5%			TCZ-39	C10Q39C	CM-19B-390J	CNO-439	10TCC-Q39
C35	39	NPO	5%			TCZ-39	C10Q39C	CM-19B-390J	CNO-439	10TCC-Q39
C36	100		5%		1469-0001	TCZ-100	22R5T1	CM-19B-101J	CNO-310	MS-31
C37	1000				BPD-001	DD-102	BYA10D1	CCD-102	GP110	5HK-D10
C38	1500				BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C39	.1	200V			CUB2P1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C40	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C41	.047	200V			P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C42	.1	200V			P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C43	1500				BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C44	1500				BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C45	3300				BPD-0033	DD-332	BYA10D33	CCD-233	GP233	5HK-D33
C46	.0075	1600V			P1684CM-0075	DD16-752	CUB16D75	16DP-3-752	GEM-16275	MB-D75
C47	.47	100V			P288N-47		CUB2P47	2DP-4-474	GEM-2047	2TM-P47

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C48	.47 100V		P288N-47		CUB2P47	2DP-4-474	GEM-2047	2TM-P47
C49	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C50	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP502	5HK-D50
C51	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Monitoradio PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	A-100-093-8	B-70-S	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Power Off-On
R2A	25K	½	A-100-093-9	B-27	A47-25K-V		U28	Squelch
B	Shaft			Not Req.	KSS-3		Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	1meg	
R4	10K	
R5	1meg	
R6	47K	
R7	470Ω	
R8	100K	
R9	150K	
R10	4700Ω	
R11	100K	
R12	10K	
R13	470K	
R14	6800Ω	
R15	47K	
R16	180K	
R17	100K	
R18	180K	

ITEM No.	RATING	REMARKS
R19	1000Ω	
R20	47K	
R21	100K	
R22	100K	
R23	220K	
R24	1meg	
R25	15K	
R26	47K	
R27	100K	
R28	220K	
R29	68K	
R30	2.2meg	
R31	2.2meg	
R32	220K	
R33	100K	
R34	27K	

ITEM No.	RATING	REMARKS
R35	1meg	
R36	470K	
R37	47K	
R38	220K	
R39	180K	
R40	1000Ω	
R41	180K	
R42	470K	
R43	470Ω	
R44	270Ω 2W	
R45	15K	
R46	330Ω	
R47	330Ω	
R48	43Ω 2W	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Monitoradio PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Antenna Coil	300-790						Model MC-160
	Antenna Coil	300-804						Model MC-40
L2	RF Coil	300-791						Model MC-160
	RF Coil	300-803						Model MC-40
L3	Crystal Osc. Cath.	300-793						Model MC-160
	Crystal Osc. Cath.	300-793						Model MC-40
L4	Crystal Osc. Plate	300-792						Model MC-160
	Crystal Osc. Plate	300-802						Model MC-40
L5	RF Choke	300-798						Model MC-160
	RF Choke	300-303-9						Model MC-40
L6	1st IF Trans.	300-077-2	16-3487	16-3487	FM-254	1463		
L7	2nd IF Trans.	300-077-2	16-3487	16-3487	FM-254	1463		
L8	3rd IF Trans.	300-322-1	16-6758	16-6758	BC-353	12-C2	RF-2	
L9	Discriminator	300-322-1	16-6758	16-6758	BC-353	12-C2	RF-2	
L10	RF Choke	300-303-3	19-1004	19-1004	BC-565	4610		
L11	"A" Lead Choke							

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	Monitoradio PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12VCT @ 1.2A	400VCT @ .050A		300-123-5						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Monitoradio PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	8600Ω	3-4Ω	(Part of SP1)	24S52	A-2931	AU-602	A-8114	24S52	S-7X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Monitoradio PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	500-402 *	4A1	* Includes Output Transformer (T2).

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				Monitoradio PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1		12V	115∿		6301	G1601/G859	6301	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	Monitoradio PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M2		*	SD-91 *	HA504 *	40K *	SR-500 *	* Silicon Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Monitoradio PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG	5A 250V			318005 (3AG 5A 250V)	155020	MTH5	HHJ

MISCELLANEOUS

ITEM No.	PART NAME	Monitoradio PART No.	NOTES
M4	Crystal	300-304	10.245KC
M5	Crystal	300-306	Specify Frequency (Model MC-160)
	Crystal	300-305	Specify Frequency (Model MC-40)

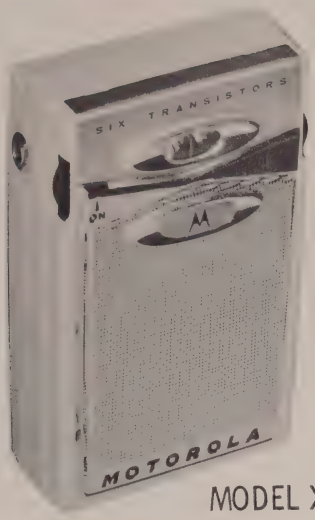
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

PHOTOFACT® Folder with CIRCUITRACE®

MOTOROLA MODELS X11B, E, G, R (Ch. HS-759)

MOTOROLA MODELS X11B, E, G, R (Ch. HS-759)



MODEL X11B

MOTOROLA MODELS X11B, E, G, R (Ch. HS-759)

TRADE NAME	Motorola Models X11B, X11E, X11G, X11R (Ch. HS-759)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Battery Operated Transistorized AM Portable Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	532 — 1620KC
RATING	4MA@9 Volts DC (No Signal, Min. Volume) 10MA@9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

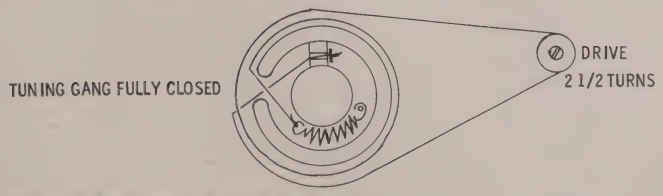
ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1, A2, A3..... GENERAL CEMENT #8607, 9291
WALSCO #2520, 2522, 2523, 2524, 2537
A4, A5..... GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400% Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1620KC	"	"	A4	"
3.	"	1400KC	Tune to 1400KC signal.	"	A5	Adjust for maximum output while rocking tuning gang.

TUNING DRIVE CORD STRINGING

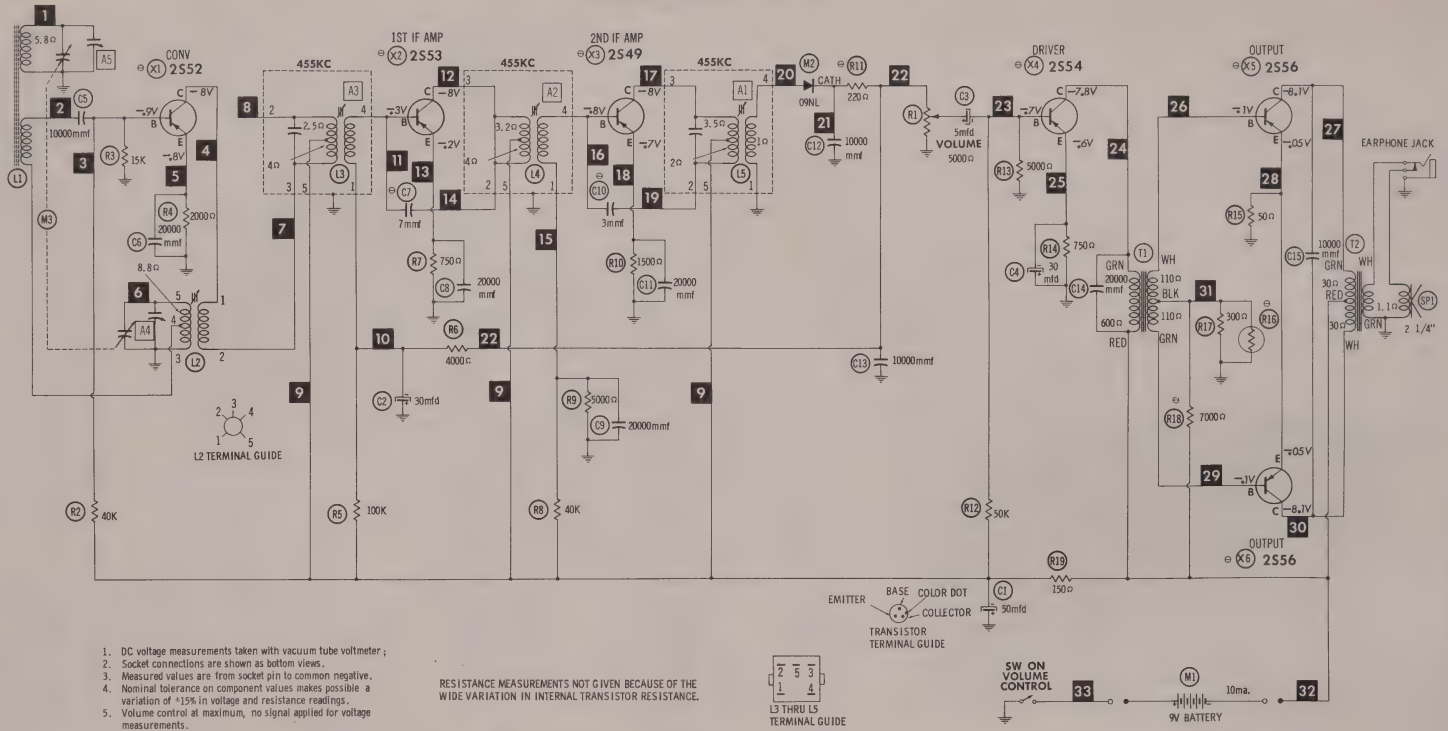


HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JF820

SET 481 FOLDER 9



1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE

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MOTOROLA MODELS X11B, E, G, R (Ch. HS-759)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S52①	Converter		2N412	2N486	2N412	PNP
X2	2S53②	1st IF Amplifier		2N410	2N483	2N410	PNP
X3	2S49②	2nd IF Amplifier		2N410	2N483	2N410	PNP
X4	2S54③	Driver		2N406	2N362	2N406	PNP
X5	2S56④	Output		2N408	2N632	2N408	PNP \ Matched
X6	2S56④	Output		2N408	2N632	2N408	PNP / Pair

① Some versions may use a 2S30, or 2N412 in this application.
② Some versions may use a 2S31, 2S53, or 2N410 in this application.
③ Some versions may use a 2S32, or 2N406 in this application.
④ Some versions may use a 2S33, or 2N408 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	50	10	23K644671					TE-1119	
C2	30	3	23K644668		NLW30-3	TT3X40		TE-1092	
C3	5	3	23K644669	XPP-3005	NLW5-6	TT6X5	ML5-6	TE-1052, 2	
C4	30	3	23K644668	XPP-3030	NLW30-3		ML30-6	TE-1092	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C6	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C7	7	Note 1	NPO-DI 6, 8	DTZ-6R8	C10V7C	CCTO-6R8	CNO-568	10TCC-V68
C8	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C9	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C10	3	Note 2	NPO-DI 3, 3	DTZ-3R3	C10V3C	CCTO-3R3	CNO-533	10TCC-V33
C11	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C12	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C13	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C14	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C15	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10

Note 1. Some versions may use 3mmf or 5mmf in this application.
Note 2. Some versions may use 5mmf or 7mmf in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	18K644694	B16-220				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	40K	
R3	15K	
R4	2000Ω	
R5	100K	
R6	4000Ω	
R7	750Ω	

ITEM No.	RATING	REMARKS
R8	40K	
R9	5000Ω	
R10	1500Ω	
R11	220Ω	Note 1
R12	50K	
R13	5000Ω	

ITEM No.	RATING	REMARKS
R14	750Ω	
R15	50Ω	
R16	Temp. Comp.	Note 2
R17	300Ω	
R18	7000Ω	Note 2
R19	150Ω	

Note 1. Early versions may use 250Ω; replace with 220Ω.
Note 2. When "2N" type transistors are used, R16 is not used and R18 is 27K.

PRINTED BOARD

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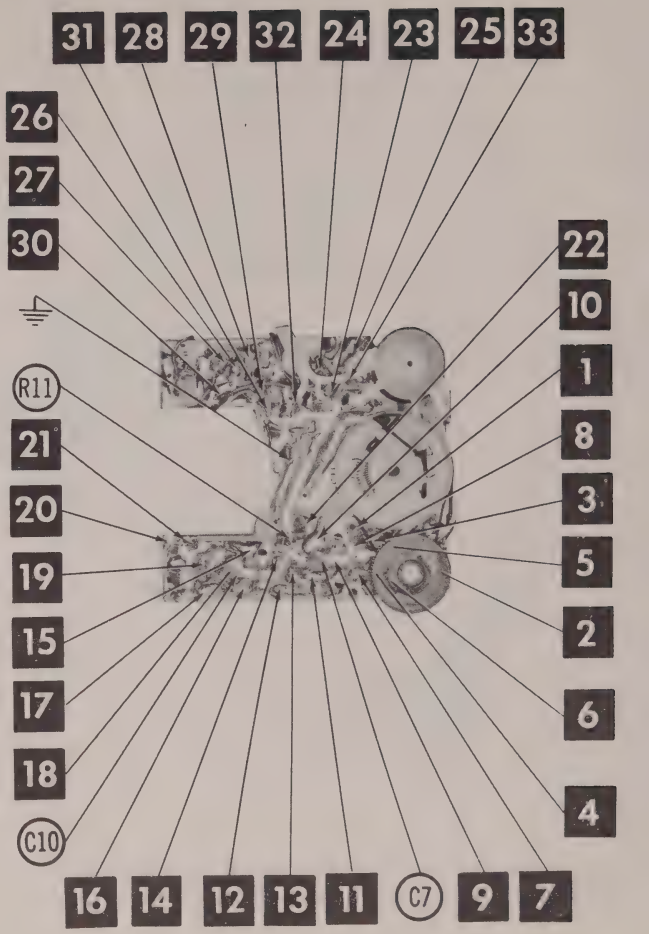


PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MOTOROLA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	24K644674						
L2	Osc. Coil	24K644675						
L3	1st IF Trans.	24K644697						
L4	2nd IF Trans.	24K644698						
L5	3rd IF Trans.	24K644699						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2	1	25K644695	TR-40①			TR-40①		① Use Original Frame

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	300Ω	8Ω	23K644696	TR-47①				TR-47①		① Use Original Frame

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	2 1/4"	PM	6-8Ω	50K644682		

BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9 V			2U6		216		M-1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		MOTOROLA PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	09NL		1N60	1N60	1N60	Detector (Pigtail)

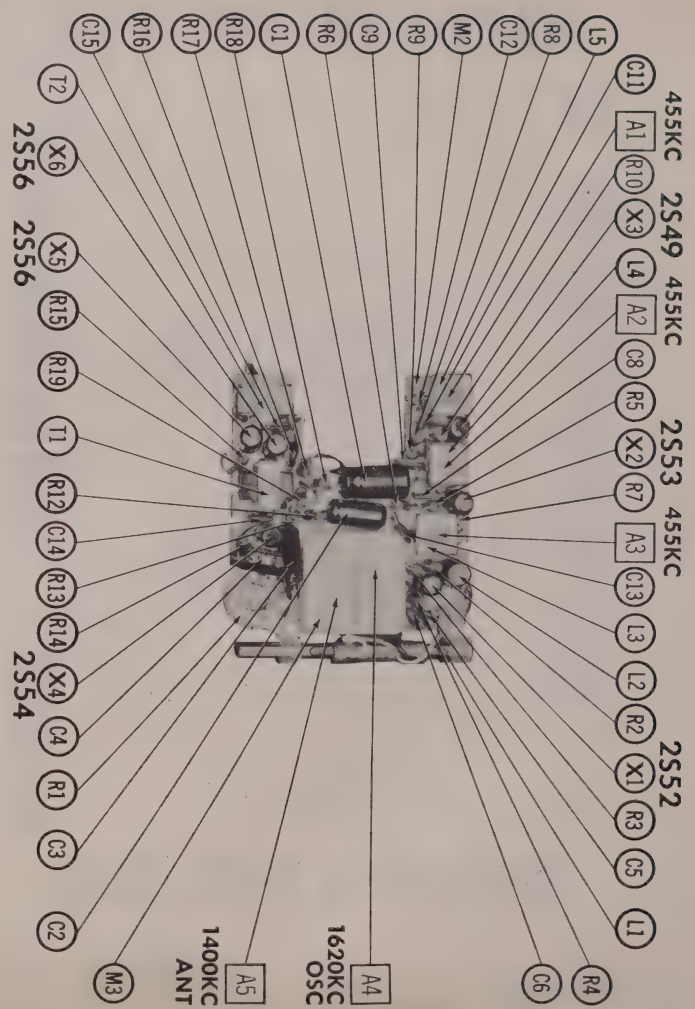
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Tuning Cap.	19K644665	2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder

RECORDIO
MODEL R-592

RECORDIO
MODEL R-592

RECORDIO
MODEL R-592

GENERAL INFORMATION

Model 592 Recordio tape recorders feature dual-track, dual-speed, monaural recording and stereophonic playback. Double-track recording gives two full-length recordings on a reel of tape. Any size reel up to seven inches can be used. A tape timer enables the operator to locate immediately any selection on a recorded tape. Two neon record-level indicators simplify the recording-level setting.

New recordings can be made on a previously recorded tape because the erase head is automatically positioned when the Record button is depressed, or the same recording may be played back indefinitely. Recordings can be made from an external radio, television receiver, phonograph, or telephone, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speaker or an external speaker or speakers by using the output jacks.

Model 592 has two tape speeds, 7 1/2 and 3 3/4 inches per second. When both tracks of the tape are used, the recording times are as follows:

Reel Size	3 3/4 Ips	7 1/2 Ips
5" (600 ft.)	1 Hour	1/2 Hour
7" (1200 ft.)	2 Hours	1 Hour

The Recordio operates on 60 cycles, 117 volts AC only. Before connecting to a line supply, be absolutely certain it agrees with the foregoing specifications. The unit will be severely damaged if connected to a direct current (DC) line.

Manufactured by:

Recordio Corporation
Charlotte, Michigan

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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SET 481 FOLDER 10

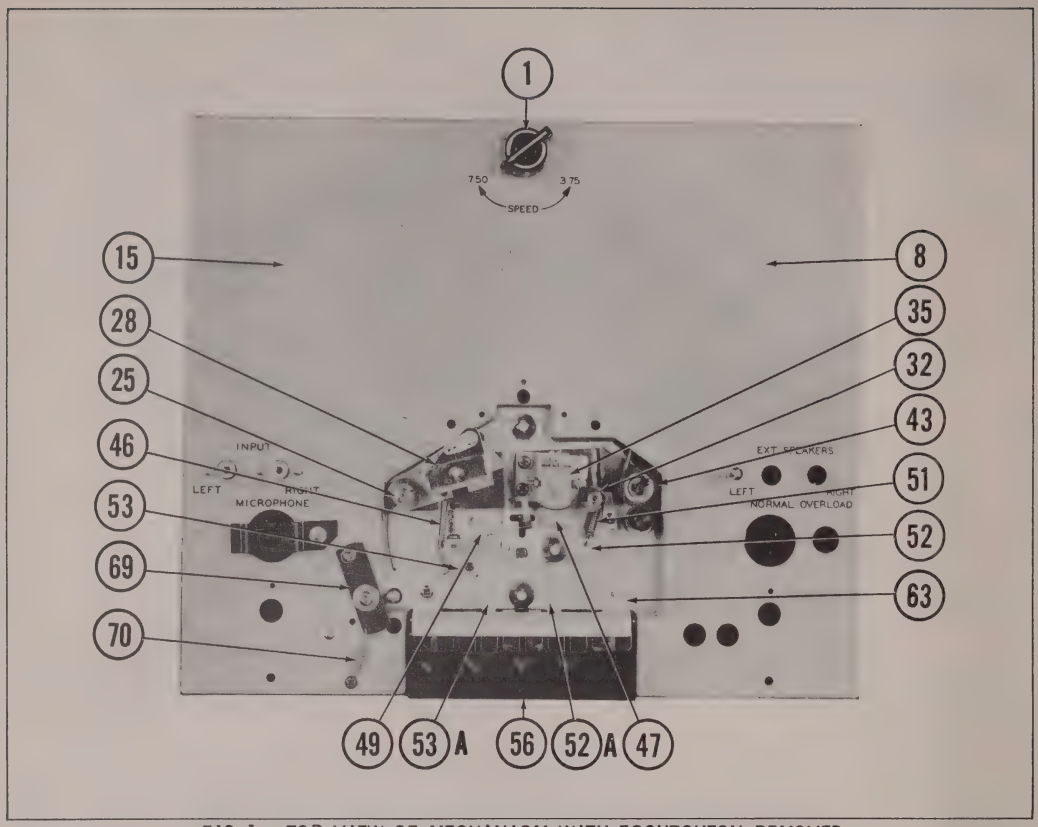


FIG. 1 TOP VIEW OF MECHANISM WITH ESCUTCHEON REMOVED

OPERATING INSTRUCTIONS

Preparing For Operation

1. Remove the AC cord, reel of tape, empty reel, and the microphone from the case storage compartment.

2. Depress the Stop button.

3. Insert the AC cord into a convenient wall receptacle of the proper rating and into the AC input on the cabinet.

4. Set the Speed Change knob to 3.75 or 7.50, as desired.

CAUTION: Do not turn Speed Change knob unless Stop button is depressed.

When the Forward or Rewind buttons are depressed, the Record and Play buttons are locked so that they cannot be pressed down, with the possibility of spilling the tape. The buttons should always be pressed down firmly until they latch. Always depress the Stop button before changing functions or speeds.

IMPORTANT: Always depress the Stop button when the recorder is not in use.

Threading The Tape

1. Place a reel of tape on reel pan (15), making certain the reel slots engage the protrusions on the pan. Place an empty reel on reel pan (8), again making certain the reel slots engage the protrusions on the pan.

2. Unwind about 14 inches of tape from the supply reel. Holding a section of tape straight with both hands, insert it into the tape slot, making certain the dull-coated side faces the heads (rear of the unit).

3. Insert the free end of the tape into one of the three slots in the hub of the take-up reel. While holding the end in place, turn the reel two or three times until the tape is secured to the reel.

To Record From a Microphone

1. Turn the Right Channel On-Off-Volume control to the right, and allow about 30 seconds for the unit to warm up.

2. Move the Record Lock lever downward with the left hand. This releases the Record Safety lock,

which prevents accidental erasure.

3. Depress the Record button with the right hand (while holding the Record Lock lever with the left hand) until it latches.

4. Adjust the large, outside knob (located on the left) until the normal level indicator just flashes while you are speaking into the microphone. The Overload indicator may flash occasionally on peak passages. It should not flash continually, which indicates distortion.

5. The Tone control is automatically disconnected when the unit is recording. When recording from a radio, set the radio tone control for maximum treble.

NOTE: To Monitor the recording, place the Monitor switch in the On position. Always turn the right-channel Volume control to minimum before recording.

To Record From an External Radio, TV Receiver, or Phonograph

1. Insert adaptor plug A-601 into the Microphone jack.

2. Insert the phonograph plug into the adaptor plug.

3. For radio or TV recording, connect the patch cord (Part No. C20.233) to the voice-coil terminals of the radio or TV receiver speaker by means of the alligator clips. Plug into the Microphone jack.

4. Proceed with recording as described under "To Record From Microphone".

NOTE: Remove patch cord and accessory plug after recording.

To Use Second Track

1. Depress the Stop button after all tape has been wound onto the take-up reel.

2. Remove reel containing tape, and place on left (supply) reel.

3. Place empty reel on right (take-up) pan.

4. Thread the tape, and proceed with the recording as previously described.

To Erase Tape

When the Record button is depressed, the erase head is automatically positioned, erasing any previous recording while a new one is being made. Material no longer needed can be erased, without recording, by depressing the Record button and turning the left Volume control knob to its minimum position. One track is erased at a time. To erase the second track, reverse the reels and repeat the foregoing operation.

To Play Recordings

1. Thread tape as described under "Threading the Tape".

2. Set the Speed Change knob to the speed at which the recording was made.

3. Depress the Play button until it latches.

4. Adjust the volume and tone to the desired listening level.

NOTE: The speaker Monitor switch must be in the On position.

High-Speed Forward or Rewind

To play a certain portion of the tape over again, it is not necessary to rewind the entire reel. Depressing the Forward or Rewind buttons will rapidly advance or reverse the tape.

Several minutes of normal recording can be skipped in a few seconds by using the Forward and Rewind buttons.

Tape Timer

If you wish to play back a certain recording while making a recording or playing back a tape, note the reading on the Timer scale at the time the particular reading is being made or heard. Rewind the tape until the same number appears on the scale. Depress the Stop button, and then the Play button.

When starting a new reel or rerecording a reel, reset the indicator pointer to "O" by rotating the Reset knob. By starting at "O" on all tapes, you can catalog the number location for each selection on any reel.

To Use Extension Speaker or Speakers

For better tone quality and power than the internal speakers can provide, it is suggested that large external speakers be plugged into the External Speaker jacks.

The Recordio Model DS-599 dual-extension speaker set enables you to use two speakers, giving more power and sound. Each speaker has a speaker jack, so that one speaker can be plugged into the other. Thus, both speakers are in operation for better monaural sound on straight playback or when the recorder is used for public-address systems. However, the recorder is suitable for use with any extension speakers of the permanent-magnet type, provided they are matched and have a 3- to 8-ohm voice coil.

For stereophonic playback, plug each extension speaker into its corresponding jack; plug the left extension speaker into the external speaker jack marked Left, and the right extension speaker into the extension jack marked Right. Place the two extension speakers (or the recorder and one extension speaker) about ten feet apart. Turn the speakers until they are at a 45-degree angle to each of the side walls, with the fronts of the speakers toward the walls and not the center of the room.

To Play Stereophonic Tapes

1. Thread tape in normal way.

2. Turn right knob to the On position.

3. Depress the Play button; and turn the large,

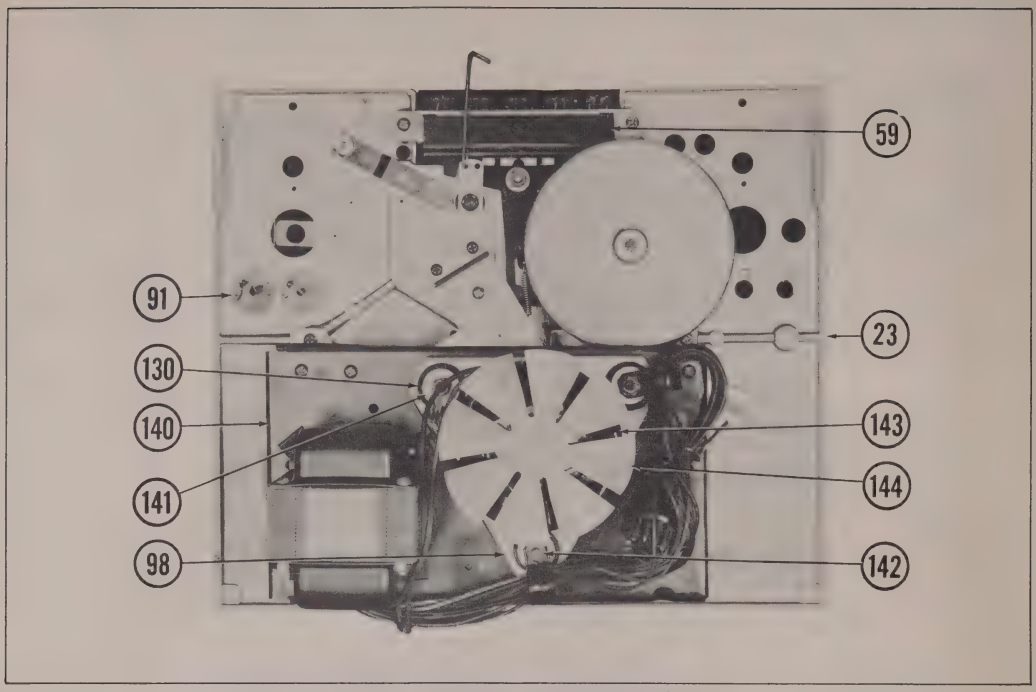


FIG. 2 BOTTOM VIEW OF MECHANISM

outside, left knob to the desired audio level—this is the left channel of the tape only.

4. Turn the right knob (right channel) to the point where the volume is the same as that of the left channel.

5. Adjust the Tone (small inside knob, left side) for the most desirable listening of the highs and lows.

To Play Stereophonic Records

When a stereophonic playback turntable is used, stereo records can be played directly through the recorder, without additional preamps, amplifiers, or speakers.

1. Insert the two turntable output cables into the left and right input jacks.

2. With the recorder in the Stop position, turn the right knob to the On position, and proceed as in "To Play Stereophonic Tapes". The speaker Monitor switch (on the right side) must be in the On position.

DISASSEMBLY INSTRUCTIONS

To Remove Unit From Case

1. Remove Volume and Tone control knobs.

2. Remove two Phillips head screws from front escutcheon.

3. Remove two hex head screws from front of base plate.

4. Remove two Phillips head screws from the rear compartment.

5. Remove Phillips head screw holding AC cord to cabinet.

6. Lift unit out of case, removing speaker leads from speakers before removing unit completely.

7. To reassemble, reverse the foregoing procedure.

To Remove Amplifier From Transport Mechanism

1. Remove the motor and power-transformer plug from the amplifier chassis.

2. Remove the four head leads from the play-record head terminal lugs.

3. Remove two slotted-head machine screws from each end of the amplifier chassis.

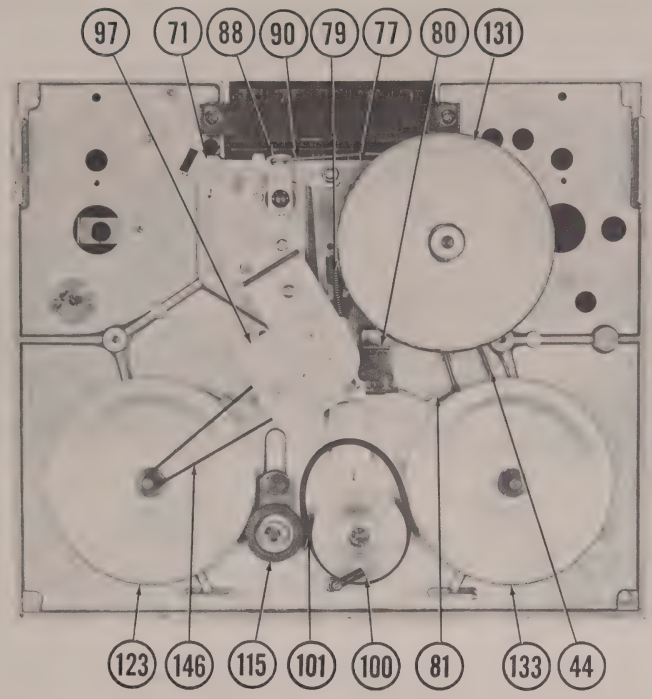


FIG.3 BOTTOM VIEW OF MECHANISM WITH DRIVE MOUNTING PLATE REMOVED

4. Carefully lift the amplifier away from the transport mechanism, and disconnect the play-record switch actuating link.

5. To reassemble, reverse the foregoing procedure.

ADJUSTMENTS

Pressure-Pad Adjustment (Refer to Exploded View)

1. Remove front escutcheon (14).

2. Depress the Play button. Do not turn the recorder on.

3. Using a pencil-type postal scale, check the pressure needed to just pull the right pad away from the play-record head. The test should be made at the end of the pressure-pad mounting spring. If necessary, adjust locked adjustment screw (50) until a reading of 1 3/4 ounce $\pm$ 1/4 ounce is obtained.

4. Adjust guide post pressure pad (left pad) by bending pressure pad spring (49). It must be adjusted for minimum pressure against the tape.

NOTE: After making the adjustments, depress the Stop button, and replace the front escutcheon.

Erase Head Adjustment

1. With tape properly threaded, turn recorder on, and depress the Record button. Allow tape to run for a few seconds; then turn recorder off, but leave Record button depressed.

2. With timer escutcheon (7) and front escutcheon (14) removed, check erase head (28) to see that it is parallel with the tape.

3. Make sure the top edge of the tape coincides with the top end of the diagonal slot in the erase head (junction of long diagonal and short vertical slot). (See Fig. 1.) To adjust the level of the tape, loosen set screw (24), and rotate tape guide post (25) to move the tape up or down. (See Exploded View.)

Brake Shoe Adjustment

1. With all push buttons in the up position, brake

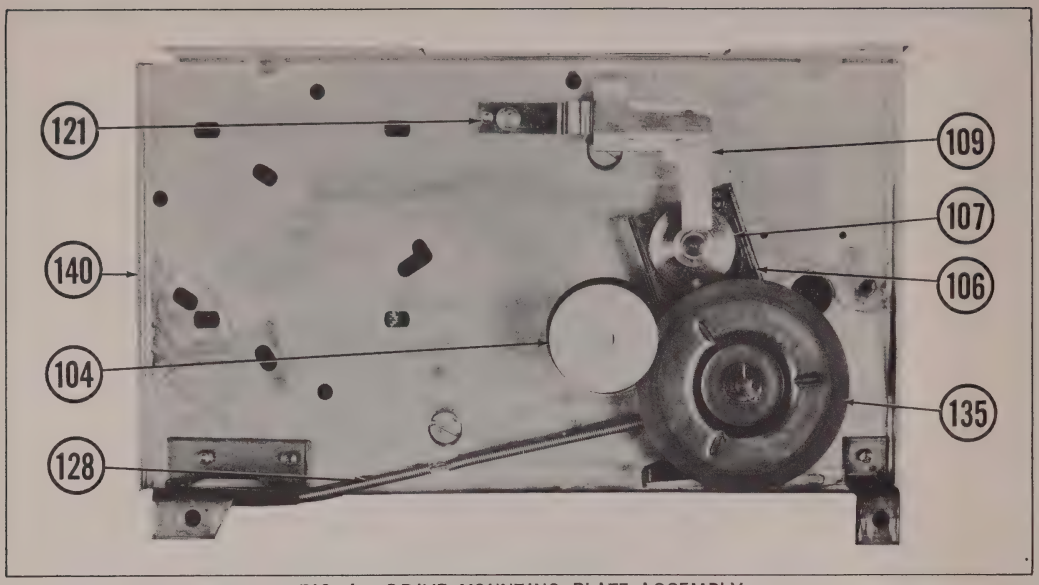


FIG. 4 DRIVE MOUNTING PLATE ASSEMBLY

pads (81) should clear brake drums (123) and (133) by approximately 1/8 inch.

2. Depress the Stop button while observing the brake pads. Both brake pads must contact the brake drums at the same time and with equal pressure.

3. If necessary, adjust the pressure by bending brake spring (80).

Head Alignment

Use standard 6- or 12- alignment tape for this procedure.

Remove front and rear escutcheons. Clean pole pieces of play-record head, using a good commercial head-cleaning agent, naptha, or lighter fluid. Proceed as follows:

1. Thread alignment tape on recorder, and turn right-channel volume on full. Connect VTVM to Right Channel External Speaker jack. Set meter for AC volts, 3-volt range.

2. Place unit in Play position, 7 1/2 ips. Decrease volume until output is 1 volt on meter. Rotate play-record head adjustment screw (33) until maximum point of deflection is found.

3. Gently press the pressure pad at a point to the extreme right of the play-record head. The output should not increase. If it does, slightly readjust the pressure pads. (See "Pressure Pad Adjustment").

CLEANING

Most defects, other than wear or breakage, can be traced to dirty surfaces. Stereo head (35), the capstan, and pinch roller (43) may accumulate tape-coating oxide, which is worn off the tape as it passes these parts. This accumulation should be periodically removed because it will cause faint recording and poor playback. Wipe these surfaces carefully with a clean cloth. If dirt is caked or hard and will not come off with a dry cloth, dampen the cloth slightly with alcohol.

LUBRICATION

All rotating parts have generous sized Oilite bearings, which are factory lubricated. Under normal use, no further lubrication is necessary. In heavy-duty service, the following parts should be lubricated once a year with a drop of No. 20 motor oil.

1. The top and bottom motor bearings.

2. The capstan bearing.

3. Pinch roller (43) bearing.

4. All idler and drive-wheel bearings.

5. The reel-spindle bearings.

The basic rule is — do not overlubricate. Oil must be kept off all rubber idlers and belts, the flywheel rim, and off any parts that might transfer oil to them. Always wipe excess lubricant from lubricated parts.

Occasionally remove foreign matter from under the plastic push-button cover, and place a drop of oil on the sliding lever members.

TROUBLE CHART

Symptom	Cause	Remedy
Motor and amplifier dead.	1. Power-supply defect.	1. Check voltages per schematic.
	2. Damaged power cord.	2. Repair or replace power cord.
	3. Defective On-Off Switch.	3. Replace On-Off switch.
Does not record.	1. Faulty microphone or cord.	1. Replace if necessary, after checking recorder with another type of input.
	2. Faulty input jack.	2. Check input jack, and replace if necessary.
	3. Faulty tube.	3. Check tubes.
	4. Open play-record head (35).	4. Check continuity. After checking, demagnetize head.
No erase, or erase is incomplete.	1. Erase head tension spring (46) disconnected or broken.	1. Connect or replace spring (46).
	2. Erase head (28) not adjusted properly.	2. See "Erase Head Adjustment" under "Adjustment".
Flutter.	1. Dirty stereo head (35), pressure pads, capstan shaft, or pinch roller (43).	1. Clean as described under "Cleaning".
Wow.	1. Brake return spring (74) disconnected or broken.	1. Connect or replace spring (74).
	2. Oil or foreign matter on drive surfaces.	2. Clean with a cloth and alcohol.
Tape spills when Stop button is depressed during fast forward or rewind.	1. Brake shoe out of adjustment.	1. See "Brake Shoe Adjustment" under "Adjustment".
	2. Brake pads worn out or missing.	2. Replace brake pads.
No fast forward or rewind.	1. Idler lever tension spring (79) disconnected or broken, thereby not actuating idler (85).	1. Connect or replace spring (79).
	2. Idler drive belt (101) broken or not properly connected.	2. Replace idler drive belt (101).
Tape fails to wind onto take-up reel during Play or Record.	1. Reel drive spring (44) loose, disconnected, or broken.	1. Connect or replace reel drive spring (44).
	2. Reel pan shaft (8) binding.	2. Remove foreign matter from bearing surfaces and shaft with clean cloth. Lubricate with one drop of No. 10 motor oil.
No drive in Play or Record.	1. Idler tension spring (128) disconnected or broken.	1. Connect or replace spring (128).

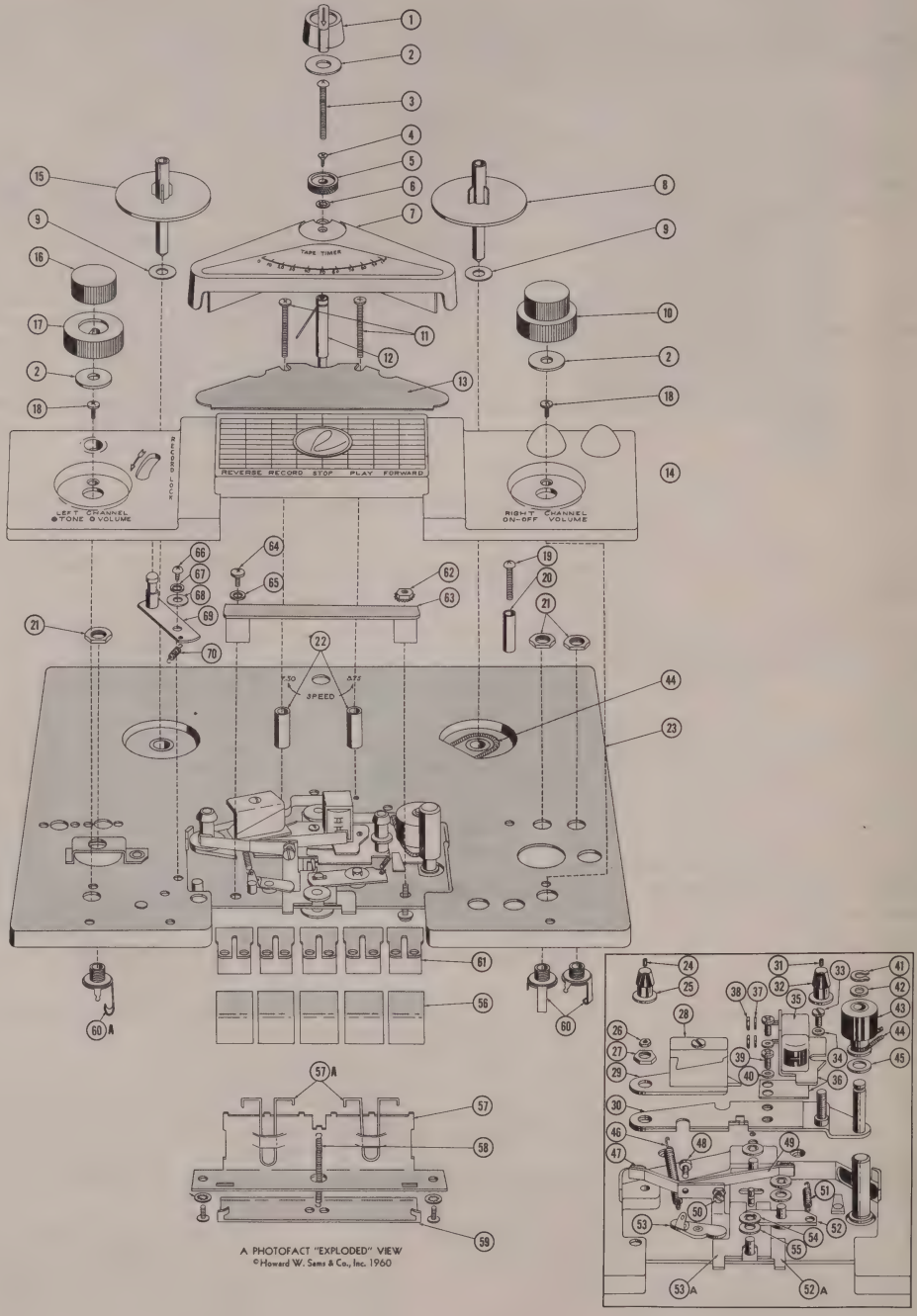


FIG. 5A EXPLODED VIEW OF PARTS ABOVE BASEPLATE

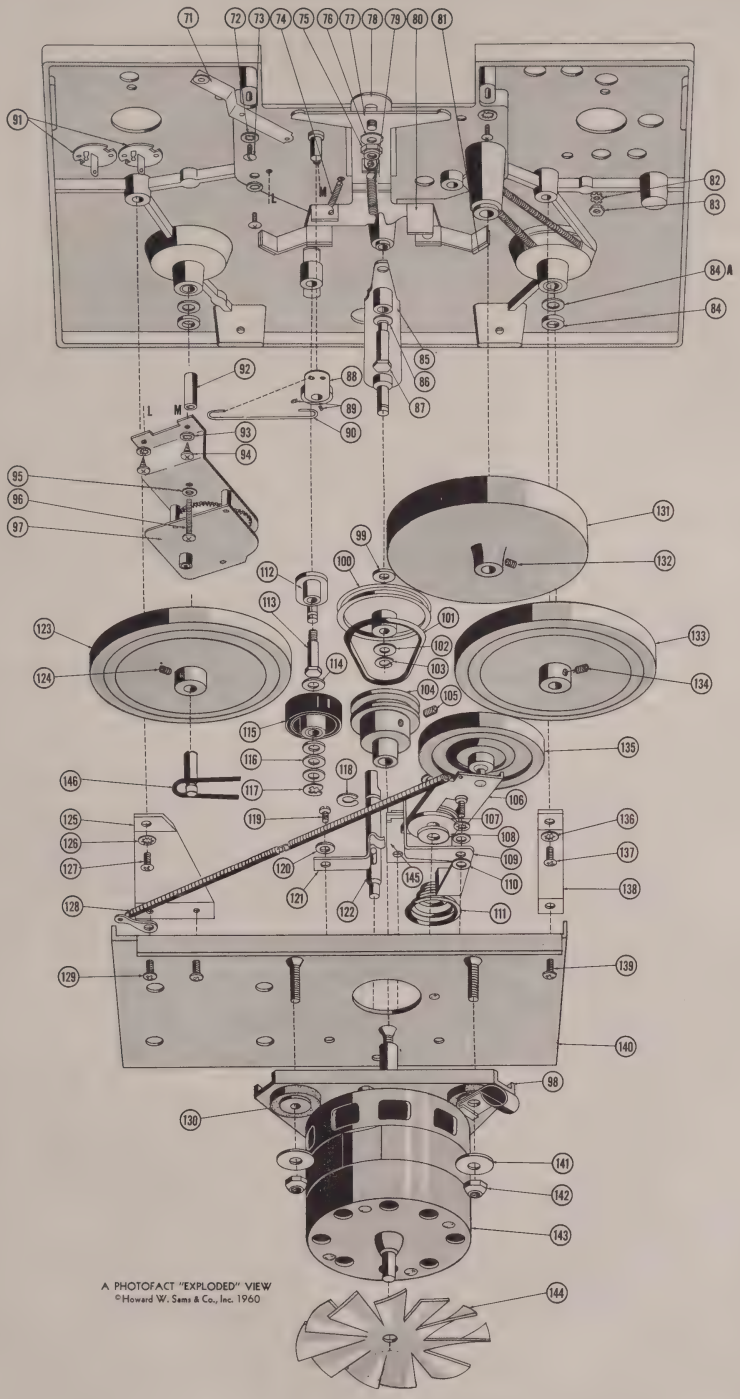


FIG. 5B EXPLODED VIEW OF PARTS BELOW BASEPLATE

TROUBLE CHART (CON'T.)

Symptom	Cause	Remedy
	2. Idler slide plate (106) binding on idler slide bushing (107), thus preventing idler wheel (135) from moving forward.	2. Check idler slide plate (106) and bushing (107) for burrs. Clean with alcohol.
Push buttons fail to latch into position.	1. Locking plate spring (58) disconnected or broken.	1. Connect or replace locking plate spring (58).
Poor high-frequency response.	1. Head not making proper contact with tape.	1. Clean the head.
	2. Improper head alignment.	2. Align head.
	3. Faulty amplifier.	3. Use standard audio trouble-shooting procedures.
Hum	1. Microphone near equipment producing hum.	1. Move microphone away from equipment.
	2. Microphone leads insufficiently shielded.	2. Make sure leads are properly shielded.
Tape scrapes against edge of reel.	1. Reel warped.	1. Replace reel.
	2. Tape guides out of adjustment.	2. Realign tape guides.
Distorted recording; low volume due to no recording bias.	1. Faulty bias oscillator tube V1 or oscillator coil L1.	1. Check V1 or L1 and replace.
	2. Faulty play-record head.	2. Replace head.

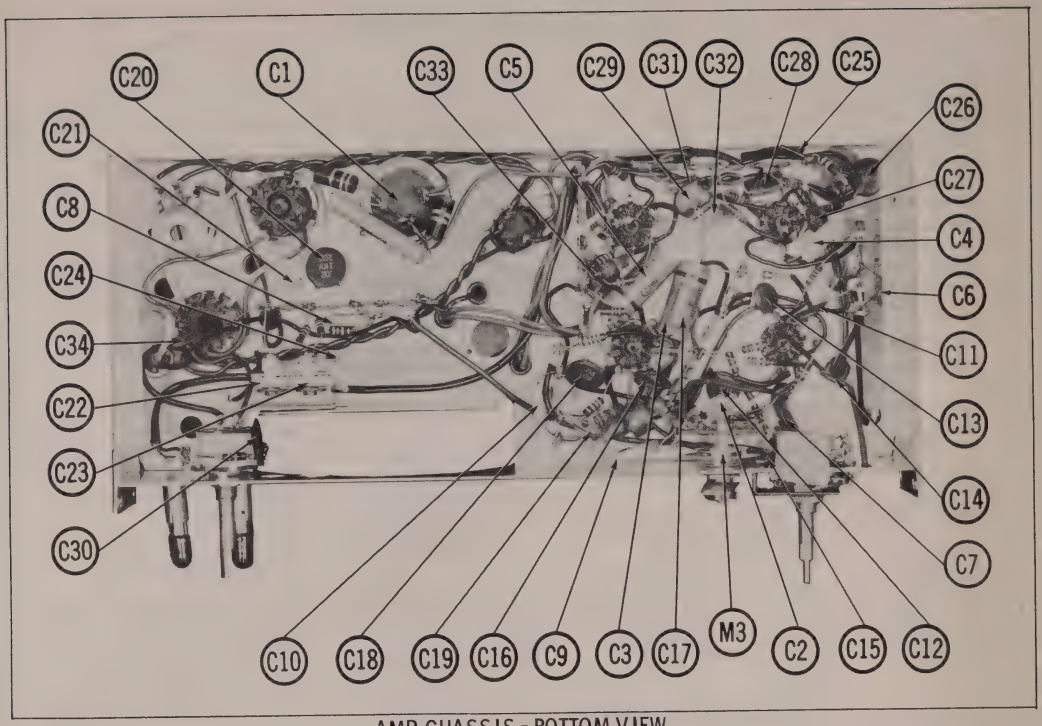
MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	C-13.253-7	Speed Shift Knob (Black)
2	73-2254-3	Felt Washer 3/4 x 1/4 I.D. x 1/16
3	57-4C-624-5	#6-32 x 1 1/2 Phillip's O.H.M.S.
4	57-4C-405-5	#4-40 x 5/16 O.H.M.S. Phil. St.
5	B-32.302-2	Timer Knob
6	73-2334-1	#6 Cantlink Washer
7	B-13.292-2	Timer Escutcheon (Silver)
8	C-13.318-0	Nylon Reel Pan and Shaft Assy.
9	B-28.163	Linen Washer 3/8 x 7/32 x .010 Black Varnished
10	C-13.422-1	Volume-On-Off Knob (Black) .250 Shaft W/.156 Flat
11	57-1C-618-1	#6-32 x 1 1/8 Phillip's B.H.M.S.
12	B-35.851-1	Timer Shaft and Indicator Assy.
13	B-19.975-2	Rear Escutcheon Plate
14	B-13.295-8	Front Escutcheon
15	C-13.318-0	Nylon Reel Pan and Shaft Assy.
16	C-13.417-1	Tone Control Knob (Black)
17	C-13.416-1	Volume Control Knob (Black)
18	57-4C-610-5	#6-32 x 5/8 Phillip's O.H.M.S. Screw
19		
20	B-19.1561	Spacer
21		Hex Nut
22	B-33.446	Spacer (2)
23	E-13.423-1	Base Plate, Gray Hammertex
24	57-3439-0	#6-32 x 3/16 Bristol Head Set Screw
25	B-32.300	Tape Guidepost (Left)
26	48-410-1	#6-32 Hex Nut
27	B-32.260	Tape Guide Post Spacer
28	B-35.1048-1	Erase Head Assembly
29	B-19.1410-1	Erase Head Plate
30	C-35.1067-3	Pinch Roller and Record Head Assembly
31	57-3439-0	#6-32 x 3/16 Bristol Hd. Set Screw
32	B-32.282	Tape Guide Post (Right)
33	57-3102-1	#4-36 x 1/4 R.H.M.S. (Azimuth Adj.)
34	73-2231-1	#4 Int. Lockwasher Stl. C.P.
35	B-36.250	Stereo Head W/M
	B-36.248	Stereo Head M/M (Alt. for B-36.250)
36		Play-Record Head Bracket Assy.
37		Int. Tooth Lockwasher
38		#2-56 x 3/16 Hex Nut
39	57-1C-603-2	#6-32 x 3/16 B.H.M.S. Stat. Brz. (2)
40	73-2231-4	#6 Int. Lockwasher (2)
41		"E" Ring 3/16 Shaft
42	B-28.163	Linen Washer
43 *	B-33.404*	*Pinch Roller
44	B-31.351	Reel Drive Spring Belt
45	B-28.163	Linen Washer
46	B-31.361	Erase Head Tension Spring

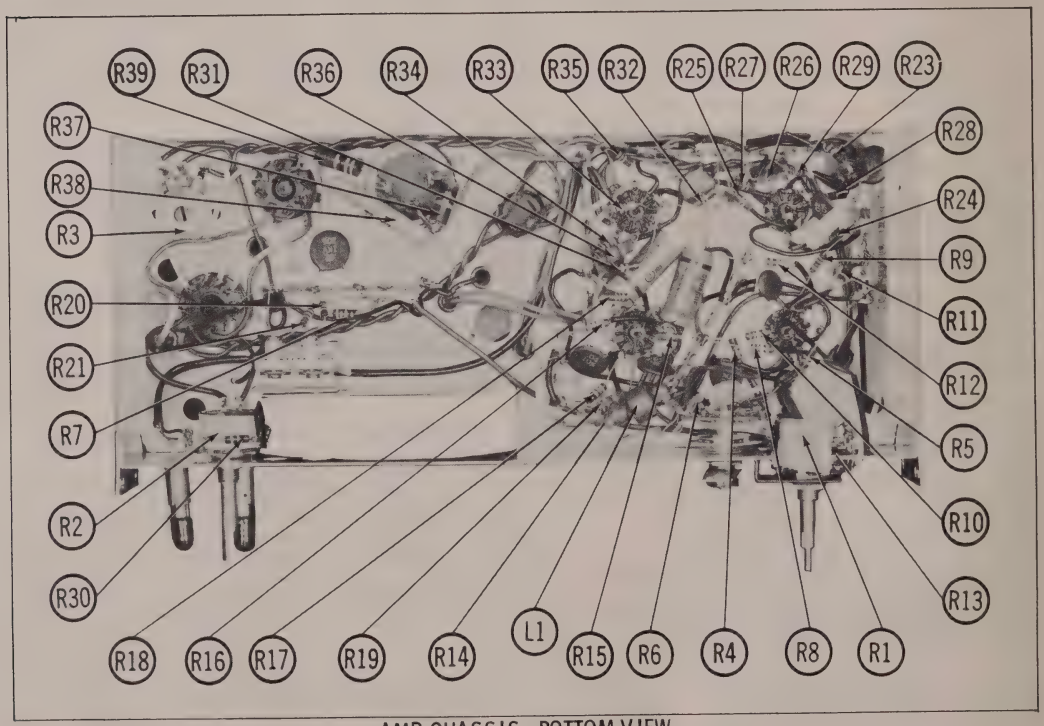
MECHANICAL PARTS LIST (CON'T.)

Ref. No.	Part No.	Description
47	B-31.334	Felt Pads (2 used)
48	57-1C-603-2	#6-32 x 3/16 B.H.M.S. Sta.Brz.
49	B-35.1047-1	Pressure Pad Assembly
50	57-16C-606-1	#6-32 x 3/8 R.H.M.S.
51	B-31.360	Pinch Roller Spring
52	B-19.881	Playback Actuating Lever
52A	B-35.1045-1	Playback Slide Plate Assy.
53	B-35.882-1	Record Actuating Lever Assy.
53A	B-19.868	Record Slide Plate
54	B-33.412	Push-on Stud Nut for 3/16 Stud
55		Flat Washer
56	B-13.258-8	Push Button (Black)
57	B-19.859	Push-button Hinge Bracket
57A		Push-button Return Spring (2)
58	B-31.343	Locking Plate Spring
59	B-19.870	Locking Plate for Push Button
60	B-33.529-2	Midget Jack Closed Circuit 3/8" lg. Bushing (Ext. Speaker 2)
60A	B-33.528-2	Midget Jack Open Circuit 3/8" lg. Bushing (Microphone)
61	B-19.876-1	Push-button Lever
62	48-2219-1	#6-32 x 5/16 Keps Hex Nut
63	B-19.858	Push-button Retaining Bracket
64	57-1C-603-2	#6-32 x 3/16 Phillips B.H.M.S.
65	73-2231-4	#6 Int. Lockwasher
66		Phillips Head Screw
67		Washer
68		Washer
69	B-35.775-1	Interlock Lever and Handle Assy.
70	B-31.338	Interlock Lever and Handle Assy. Return Spring
71	B-35.774-1	Record Interlock Assy.
72	73-2241-154	Lockwasher 5/16 O.D. x .144
73	57-3445-1	#8-32 x 3/8 R.H.M.S.
74	B-31.338	Brake Return Spring
75	48-2221	#10-32 Hex Nut (Elastic Stop Nut)
76	73-2241-148F	Flat Washer 1/2 O.D. x .205 I.D. x 1/32 Stl. C.P.
77	B-35.1046-1	Shift Plate Assy.
78	B-35.835	Brake Slide Plate Assy.
79	B-31.339	Idler Lever Tension Spring
80	B-35.1070-1	Brake Spring Assy.
81		Brake Pad Felt
82		Phillips Head Screw
83		Hex Nut
84A	B-28.163	Linen Washer
84	73.2248-39	Flat Washer .425 O.D. x .255 x .070 Phenolic
85	B-35.1051	Idler Lever Assy.
86	B-31.382	Spring Washer
87	B-32.275	#8-32 Hex Hd. Shoulder Screw
88	B-35.859-2	Switch Lever Assy.
89	57-3439-0	#6-32 x 3/16 Bristol Head Set Screw
90	B-31.333	Switch Arm Link
91		Phono Jack (2)
92	B-33.118	Spacer For Gear Train
93	73-2231-4	#6 Int. Lockwasher
94	57-1C-603-2	#6-32 x 3/16 B.H.M.S. Phillips
95	73-2231-4	#6 Int. Lockwasher
96	57-1C-614-1	#6-32 x 7/8" B.H.M.S. Phillips
97	D-33.445	Gear Train for Tape Index
98	C-19.837	Motor Adaptor Plate
99	B-28.163	Linen Washer
100	B-35.1066	Sheave Pulley Assy.
101 *	B-28.181 *	* Idler Drive Belt
102	B-28.163	Linen Washer
103		"E" Ring, 3/16" Shaft
104	B-32.288	Motor Pulley
105	57-3589-1	#8-32 x 1/4" Bristol Hd. Set Screw
106	B-35.1064-1	Idler Slide Plate Assy.
107	B-32.264	Idler Slide Bushing
108		Flat Washer Steel
109	B-19.1431-1	Idler Throw-out Lever
110	B-32.291-1	Shouldered Washer
111	B-31.327	Idler Lift Compression Spring
112	B-35.1044	Sub-Idler Plate Assy.
113	B-32.275-1	#8-32 Hex Hd. Shoulder Screw
114	B-28.163	Linen Washer
115	B-33.405	Sub-Idler Wheel
116	73-2254-6	Felt Washer
117		"E" Ring 3/16" Shaft
118	B-33.407-1	"C" Washer
119	57-1C-603-2	#6-32 x 5/16" Phillip's B.H.M.S
120	73-2231-4	#6 Int. Lockwasher
121	B-19.961	Detent Spring
122	B-35.816-1	Speed Control Shaft Assy.
123	C-35.835-1	Brake Drum and Bushing Assy.
124	57-3589-1	#8-32 x 1/4 Bristol Hd. Set Screw
125	B-19.976-1	Drive Mounting Plate Bracket
126	73-2231-5	#8 Int. Lockwasher
127	57-6C-805-1	#8-32 x 5/16" Phillip's R.H.M.S
128	B-31.324	Idler Tension Spring (2)
129	57-6C-805-1	#6-32 x 5/16" Phillip's B.H.M.S
130	B-28.194	Lord Shockmount (3)
131	C-13.257-1	Flywheel
132	57-3589-1	#8-32 x 1/4" Bristol Hd. Set Screw
133	C-35.835-1	Brake Drum and Bushing Assy.
134	57-3589-1	#8-32 x 1/4" Bristol Hd. Set Screw
135	B-33.408	Idler Wheel, 2 1/2" Dia.
136	73-2231-5	#8 Int. Lockwasher
137	57-6C-805-1	#8-32 x 5/16" Phillip's R.H.M.S
138	B-19.862	Angle Bracket for Mounting Drive Assembly
139	57-6C-805-1	#8-32 x 5/16" Phillip's R.H.M.S
140	D-35.1054	Drive Mounting Plate Assy.
141	B-33.411	Flat Washer 3/4 O.D. x 3/16 I.D. x .050 (3)
142	48-2221	#10-32 Hex Nut (Elastic Stop Nut)
143	D-36.153	Motor Round Type Fasco
	D-36.241	Motor Universal
144	B-19.887-1	Fan Blade (Used With Fasco Motor)
	C-19.1553	Fan Blade (Used With Universal Motor)
145	B-19.878-1	Speed Shift Lever
146	B-28.181	Counter Belt

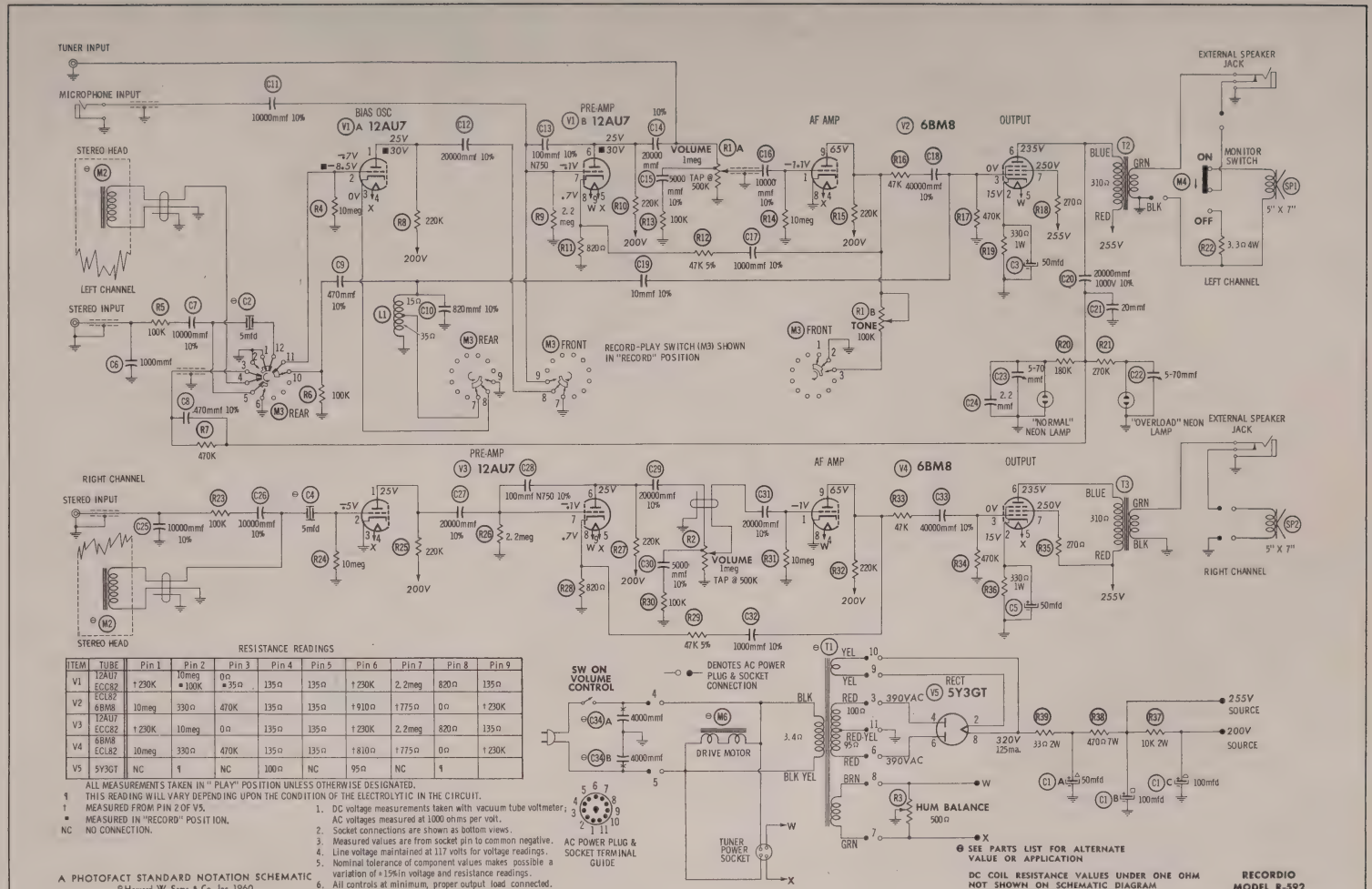
* Walsco Replacement Part No.
1430 Idler Drive Belt, 1457 Pinch Roller.



AMP CHASSIS - BOTTOM VIEW



AMP CHASSIS - BOTTOM VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AU7 ECC82	†230K	10meg •100K	0Ω •35Ω	135Ω	135Ω	†230K	2.2meg	820Ω	135Ω
V2	ECL82 6BM8	10meg	330Ω	470K	135Ω	135Ω	†910Ω	†775Ω	0Ω	†230K
V3	12AU7 ECC82	†230K	10meg	0Ω	135Ω	135Ω	†230K	2.2meg	820Ω	135Ω
V4	6BM8 ECL82	10meg	330Ω	470K	135Ω	135Ω	†810Ω	†775Ω	0Ω	†230K
V5	5Y3GT	NC	¶	NC	100Ω	NC	95Ω	NC	¶	

ALL MEASUREMENTS TAKEN IN " PLAY" POSITION UNLESS OTHERWISE DESIGNATED.

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

† MEASURED FROM PIN 2 OF V5.

• MEASURED IN "RECORD" POSITION.

NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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RECORDIO MODEL R-592

AMP PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Bias Oscillator-Left Channel Preamp.	12AU7/ECC82	V3	Right Channel Preamp.	12AU7/ECC82
V2	Left Channel AF Amp. - Left Channel Output	6BM8/ECC82	V4	Right Channel AF Amp. - Right Channel Output	6BM8/ECC82
			V5	Rectifier	5Y3GT

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA RECORDIO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲50	300	B-5.421-11		BO332	FP227.7		TVLS-4438.1*	
B	■100	300			BR5035	TC79			
C	▲100	300							
C2	5	6 VNP	Note 1	NP-PRS7300	BBR10-50 †	TCN105			
C3	50	12.5	B-5.464	PRS1265	BBR50-25	TC29	TD-50-25	TVA-1206	
C4	5	6 VNP	Note 1	NP-PRS7300	BBR10-50 †	TCN105			
C5	50	12.5	B-5.464	PRS1265	BBR50-25	TC29	TD-50-25	TVA-1206	

Note 1. Some versions may use 2.2mfd@3V in this application (Part #B-5.467.1).
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C7	10000 10%		DI-10000		PM6S1	CCD-103	GEM-1611	10TS-S10
C8	470 10%		1469-00047	DD-471	5R5T47	CM-20B-471K	MCJ244	MS-347
C9	470 10%		1469-00047	DD-471	5R5T47	CM-20B-471K	MCJ244	MS-347
C10	820 10%		1469-00082	DD-821	1R5T82	CM-20B-821K	MCB251	MS-382
C11	10000 10%		DI-10000		PM6S1	CCD-103	GEM-1611	10TS-S10
C12	20000 10%				PM6S2	6DP-2-203	GEM-1612	10TS-S20
C13	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C14	20000 10%				PM6S2	6DP-2-203	GEM-1612	10TS-S20
C15	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C16	10000 10%		DI-10000		PM6S1	CCD-103	GEM-1611	10TS-S10
C17	1000 10%		1469-001	DD-102	1R5D1	CM-20B-102K	MCB255	MS-21
C18	40000 10%				PM6S4	6DP-3-403	GEM-1614	6TM-S4
C19	10 10%		1469-00001	DD-100	22R5Q1	CM-20B-100K	MCB215	MS-41
C20	20000 1000V 10%					16DP-4-203	GEM-1612	10TS-S20
C21	20		SI 20	DD-200	LI0Q2	CCD-200	GP420	10TS-Q20
C22	5-70					462		
C23	5-70	#B-4.145				462		
C24	2.2		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C25	10000 10%		DI-10000		PM6S1	CCD-103	GEM-1611	10TS-S10
C26	10000 10%		DI-10000		PM6S1	CCD-103	GEM-1611	10TS-S10
C27	20000 10%				PM6S2	6DP-2-203	GEM-1612	10TS-S20
C28	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C29	20000 10%				PM6S2	6DP-2-203	GEM-1612	10TS-S20
C30	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C31	20000 10%				PM6S2	6DP-2-203	GEM-1612	10TS-S20
C32	1000 10%		DI-1000	DI-102	1R5D1	CM-20B-102K	MCB255	MS-21
C33	40000 10%				PM6S4	6DP-3-403	GEM-1614	6TM-S4
C34A	4000	①②	BPD-2X004	DD3-502	BCY6DD4	6DP-1-402	B2X250	5HK-2D40
B	4000	①②				6DP-1-402		

\# Recordio Part Number.
① Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RECORDIO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg 500K Tap	½	B11-288	F1-56		† QJ-1104R	■ UE3987	Volume, Left Channel
B	100K	½		R2-31				Tone, Left Channel
R2A	1meg 500K Tap	½	C-8.227-2	BT-74	A47F5-1meg	QJ7-137X	UT-443	Volume, Right Channel
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	Power Off-On
R3A	500Ω	½	B-8.240	AB-4	B47-500-S	B11-103	PTA52L	Hum Balance
B	Shaft			AK-1	Not Req.	SK2	Not Req.	

† "Concentrikit" equivalent: K-2 Kit with base elements & shafts: B19-137X, P1-106 (Panel). Not available as a factory assembled unit. B11-128, R1-118 (Rear).
■ "STA-LOC" equivalent: FA16T55, RU15L, OF1125, IS1525.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	10meg	
R5	100K	
R6	100K	
R7	470K	
R8	220K	
R9	2.2meg	
R10	220K	
R11	820Ω	
R12	47K 5%	
R13	100K	
R14	10meg	
R15	220K	

ITEM No.	RATING	REMARKS
R16	47K	
R17	470K	
R18	270Ω	
R19	330Ω 1W	
R20	180K	
R21	270K	
R22	3.3Ω 4W	
R23	100K	
R24	10meg	
R25	220K	
R26	2.2meg	
R27	220K	

ITEM No.	RATING	REMARKS
R28	820Ω	
R29	47K 5%	
R30	100K	
R31	10meg	
R32	220K	
R33	47K	
R34	470K	
R35	270Ω	
R36	330Ω 1W	
R37	10K 2W	
R38	470Ω 7W	
R39	33Ω 2W	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA RECORDIO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Bias Osc.	B-1.557						

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA RECORDIO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .85A	580 VCT @.125A	5V@ 2A	D-9.262 ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V@ 1.8A									

① Part #C-35.1271-1 includes plug.

AMP PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	RECORDIO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4100Ω	3-4Ω	C-9-303	26S50	A-3018	AU-604	A-8092	26S50	S-5Z	
T3	4100Ω	3-4Ω	C-9-303	26S50	A-3018	AU-604	A-8092	26S50	S-5Z	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	RECORDIO PART No.	QUAM PART No.	
SP1	5"x 7"	PM	3-4Ω	C-30.363-1	57A1	
SP2	5"x 7"	PM	3-4Ω	C-30.363-1	57A1	

MISCELLANEOUS

ITEM No.	PART NAME	RECORDIO PART No.	NOTES
M1	Erase Head	C-35.756-1	
	Erase Head	B-35.1048-1	
M2	Stereo Head	B-36.250	
	Stereo Head	B-36.248	
M3	Function Switch	C-35.1266-1	Assembly, Includes Function Switch Part #B-11.282
M4	Switch		Monitor Switch (SPDT, Slide Type)
M5	Switch		Speed Control
M6	Motor	D-36.153	Round Type
	Motor	D-36.241	Universal
	Microphone	B-36.195	Crystal

CABINETS & CABINET PARTS

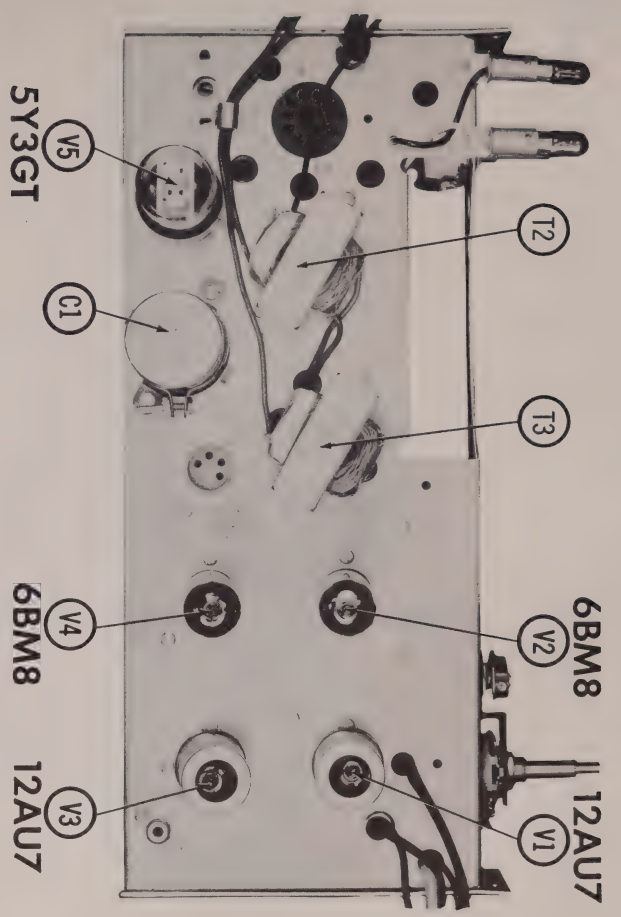
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	C-13.422-1	Off-On Volume (Black) . 250" Shaft W/ . 156" Flat
Knob	C-13.416-1	Volume (Black) . 202" Shaft W/ . 156" Flat
Knob	C-13.417-1	Tone (Black) . 265" Shaft W/ . 234" Flat
Knob	B-32.302-2	Timer (Aluminum)
Knob	C-13.253-7	Speed Shift (Black)
Pushbutton	B-35.1043-1	Assembly (Black) 5 Used
Cabinet	8-2486-1	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

AMP CHASSIS—TOP VIEW



PHOTOFACT® Folder

H. H. SCOTT
MODEL 320

H. H. SCOTT
MODEL 320

H. H. SCOTT
MODEL 320

TRADE NAME	H. H. Scott Model 320		
MANUFACTURER	Hermon Hosmer Scott, Inc., 111 Powder Mill Road, Maynard, Mass.		
TYPE SET	AC Operated 10 Tube FM-AM Tuner		
POWER SUPPLY	105-125 Volts AC, 50-60 Cycles	RATING	35 Watts, .31 Amp. @ 117 Volts AC
TUNING RANGE	BROADCAST 540-1620KC	FREQ. MOD.	88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JL-615

AM ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

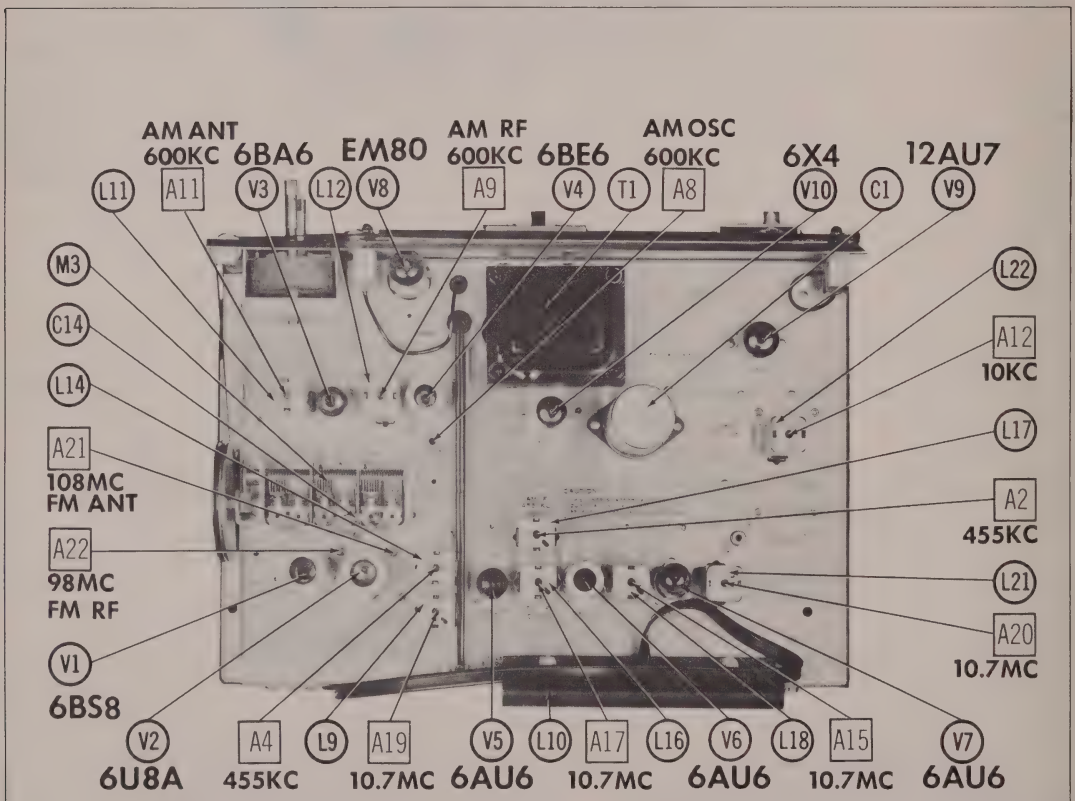
Use only enough generator output to provide a usable indication on VTVM.

Suggested Alignment Tools:

A1 thru A4, A9 thru A12, A14 thru A19 ...	GENERAL CEMENT #5097, 8727 WALSCO #2515
A5, A6, A7, A23	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A8, A13, A20	GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440 WALSCO #2526, 2543, 2544, 2545
A21, A22	GENERAL CEMENT #8721, 8722 WALSCO #2519

AM ALIGNMENT - SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru . 1mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400~ Mod.)	(AM) Tuning gang fully open	AC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	High side thru . 01mfd to AM antenna terminal. (Disconnect shorting link). Low side to chassis.	1600KC	1600KC	"	A5, A6, A7	"
3.	"	600KC	600KC	"	A8, A9, A10, A11	"
4.	"	1400KC (10KC Mod.)	Tune to 1400KC signal	"	A12, R2	Adjust for MINIMUM deflection.



CHASSIS TOP VIEW

FM ALIGNMENT INSTRUCTIONS

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .01mfd to pin 2 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference	DC probe to point (B). Common to point (C).	A13, A14, A15, A16, A17, A18, A19	Adjust for maximum deflection.
6.	"	"	"	DC probe to point (D). Common to chassis.	A20	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .01mfd to pin 2 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC swp.)	(FM) Point of non-interference	Vert. Amp. to point (B). Low side to chassis.	A13, A14, A14, A16, A17, A18, A19	Disconnect stabilizing capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1. Reconnect C2.
6.	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A20	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Across FM antenna and "G" terminals with 120Ω in each lead.	108MC (Unmod.)	(FM) 108MC	DC probe to point (B). Common to point (C).	A21	Adjust for maximum deflection.
8.	"	92MC	92MC	"	L6	Adjust for maximum deflection.by expanding or compressing coil turns.
9.	"	98MC	98MC	"	A22, A23	Adjust for maximum deflection.

FIG. 1

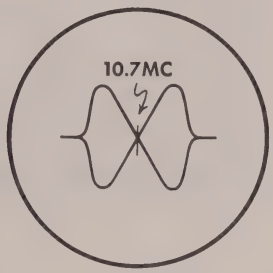
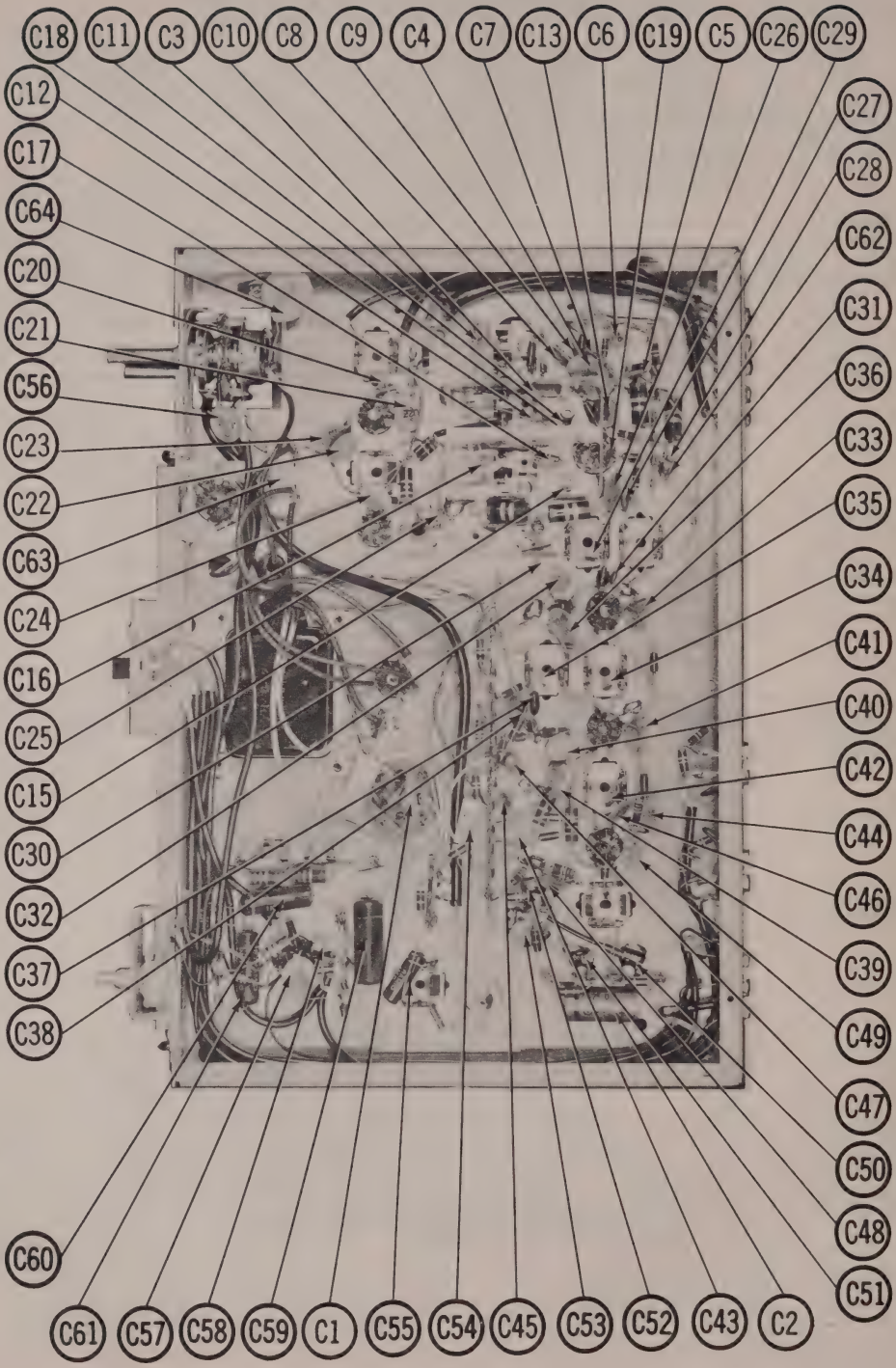
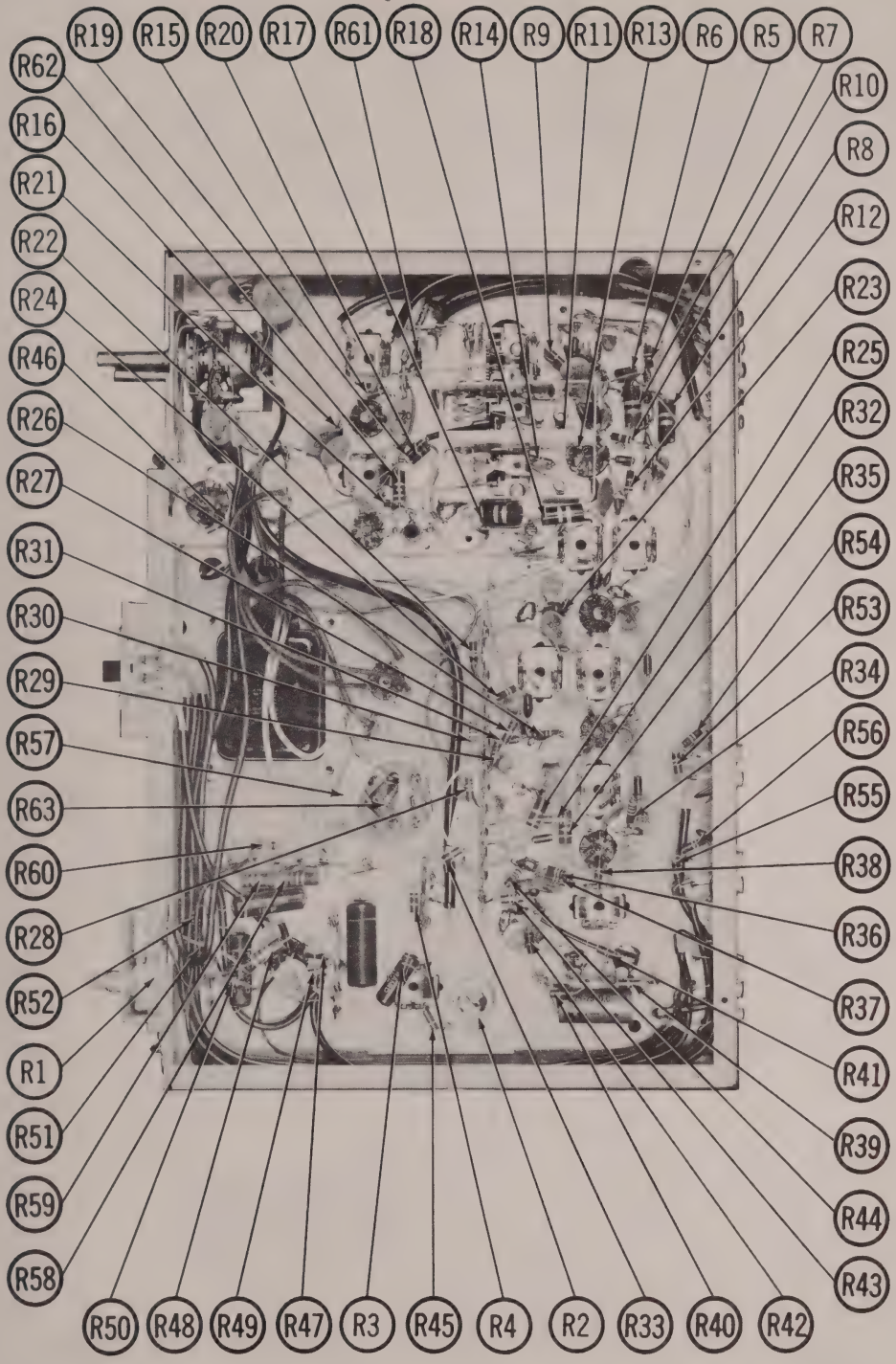


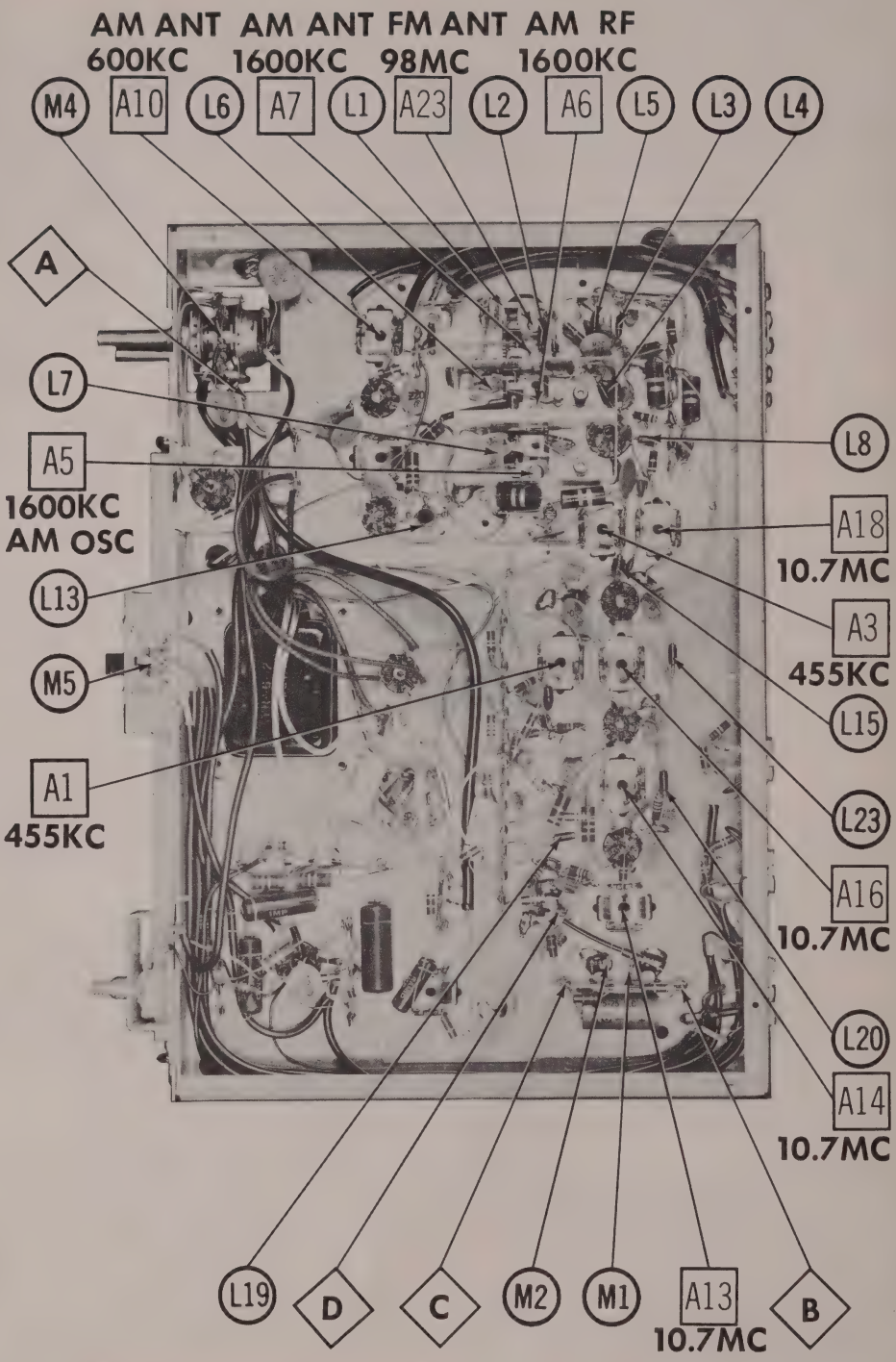
FIG. 2



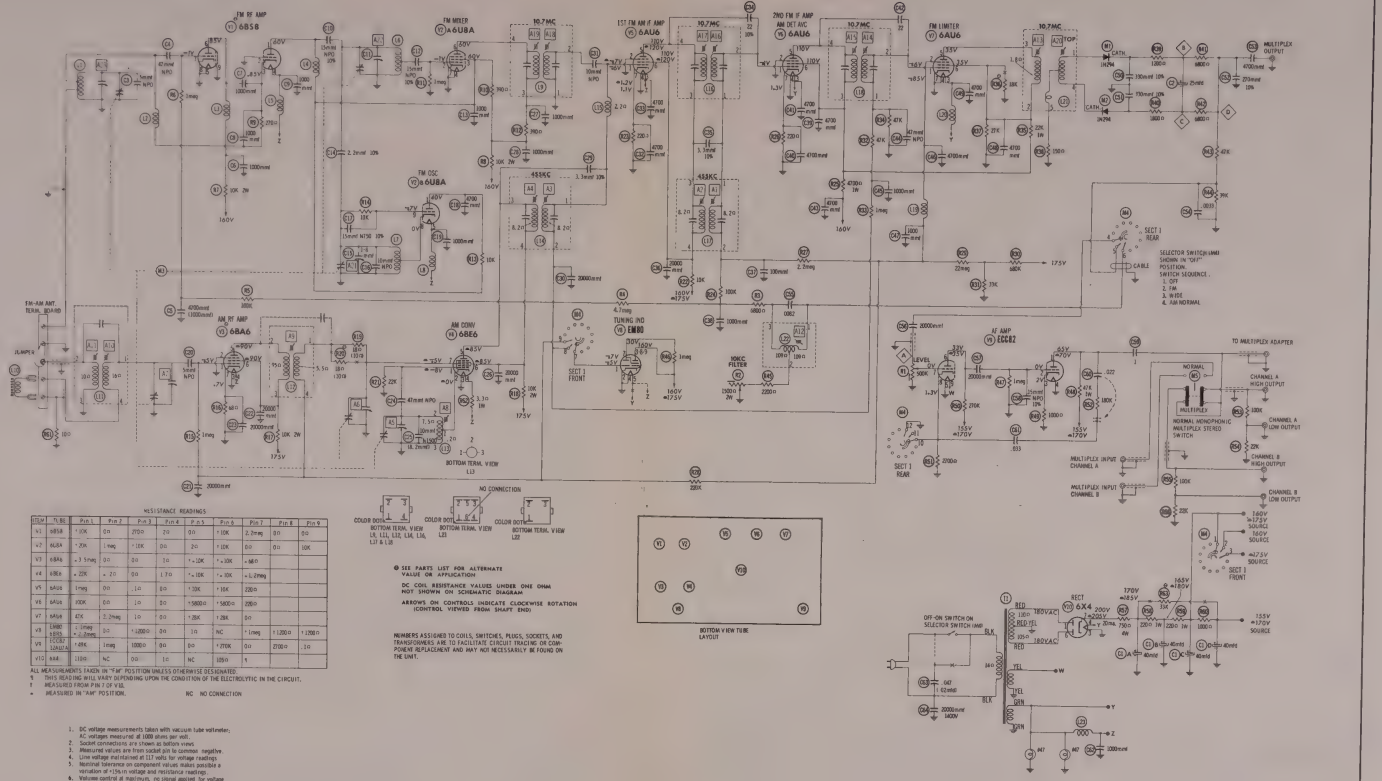
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW - ALIGNMENT, INDUCTOR & MISC. IDENT.


FM RF AMP V1 6BS8
FM MIXER V2 6U8A
FM OSC V3 6U8A
10.7MC
1ST FM AM IF AMP V5 6AU6
455KC
2ND FM IF AMP AM DET AVC V6 6AU6
FM LIMITER V7 6AU6
MULTIPLEX OUTPUT
SECT I REAR
SELECTOR SWITCH UNIT SHOWN IN "OFF" POSITION. SWITCH SEQUENCE: 1. OFF 2. FM 3. WIDE 4. AM NORMAL
FM-AM ANT. TERM. BOARD
AM RF AMP V4 6BA6
AM CONV V8 6BE6
TUNING IND V9 EM80
SECT I FRONT
455KC FILTER
AF AMP V10 ECC82
TO MULTIPLEX ADAPTER
NORMAL MULTIPLEX
MULTIPLEX INPUT CHANNEL A
MULTIPLEX INPUT CHANNEL B
NORMAL MONOPHONIC MULTIPLEX STEREO SWITCH
CHANNEL A HIGH OUTPUT
CHANNEL A LOW OUTPUT
CHANNEL B HIGH OUTPUT
CHANNEL B LOW OUTPUT
160V SOURCE
155V SOURCE
SECT I FRONT
OFF-ON SWITCH ON SELECTOR SWITCH UNIT
SECT 6X4 V10
180V.AC
170V
155V
NO CONNECTION
COLOR DOT BOTTOM TERM. VIEW L9, L11, L12, L14, L16, L17 & L18
COLOR DOT BOTTOM TERM. VIEW L20
COLOR DOT BOTTOM TERM. VIEW L22
BOTTOM TERM. VIEW L13
BOTTOM VIEW TUBE LAYOUT
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BS8	* 10K	0Ω	270Ω	2Ω	0Ω	* 10K	2.2meg	0Ω	0Ω
V2	6U8A	* 70K	1meg	* 10K	0Ω	2Ω	* 10K	0Ω	0Ω	10K
V3	6U8A	▲ 3.5meg	0Ω	2Ω	1Ω	* ▲ 2K	* ▲ 10K	▲ 4MΩ		
V4	6BA6	▲ 22K	▲ 2Ω	0Ω	1.7Ω	* ▲ 10K	* ▲ 10K	▲ 1.2meg		
V5	6AU6	1meg	0Ω	1Ω	0Ω	* 10K	* 10K	220Ω		
V6	6AU6	100K	0Ω	1Ω	0Ω	* 5800Ω	* 5800Ω	220Ω		
V7	6AU6	47K	2.2meg	1Ω	0Ω	* 2K	* 2K	0Ω		
V8	EM80 6BE6	* 1meg ▲ 2.2meg	0Ω	* 1200Ω	0Ω	1Ω	NC	* 1meg	* 1200Ω	* 1200Ω
V9	EM80 6BE6	* 68K	1meg	1000Ω	0Ω	0Ω	* 270K	0Ω	2700Ω	1Ω
V10	6AB8	1Ω	NC	0Ω	1Ω	NC	1Ω	1		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
* THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V1B.
▲ MEASURED IN "AM" POSITION. NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter.
   AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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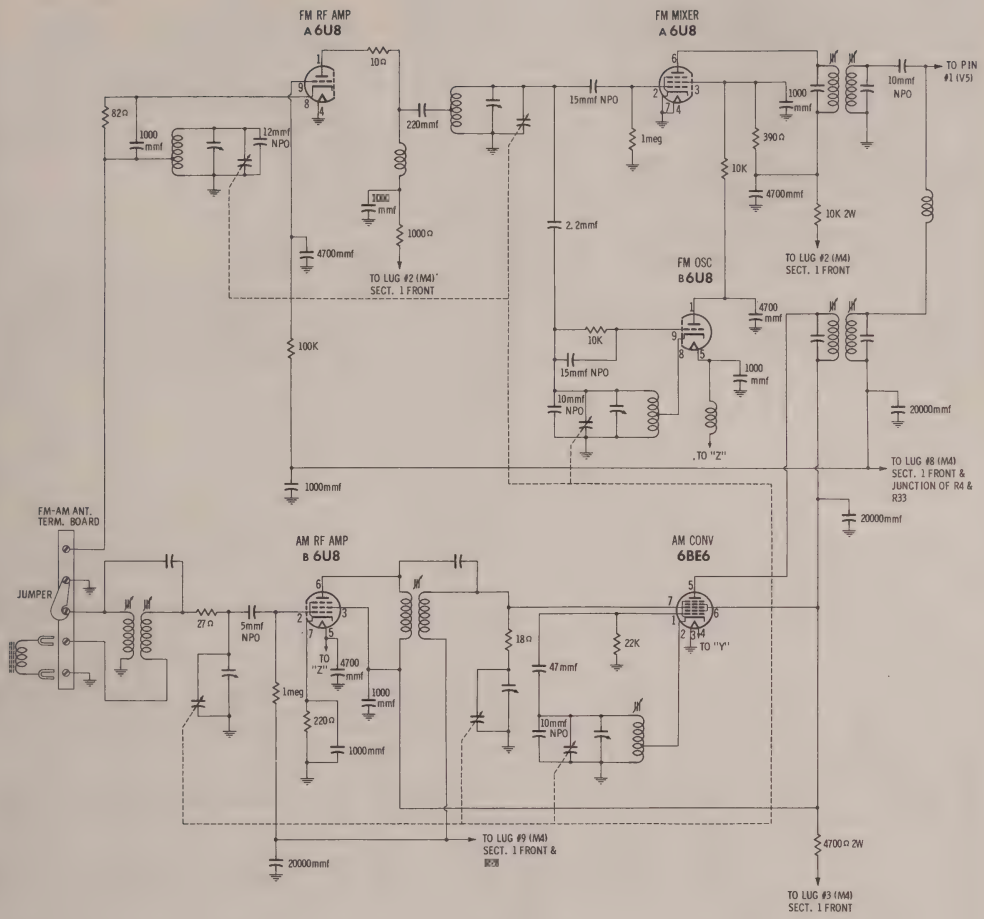
H. H. SCOTT
MODEL 320



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H. H. SCOTT
MODEL 320

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	CBS / GENERAL ELECTRIC / RAYTHEON / SYLVANIA TYPE
V1	FM RF Amplifier	6BS8 (6BQ7) * ①
V2	FM Mixer - Osc.	6U8A
V3	AM RF Amplifier	6BA6 ①
V4	AM Converter	6BE6
V5	1st FM-AM IF Amp.	6AU6
V6	2nd FM IF Amp. - AM Det. - AVC	6AU6
V7	FM Limiter	6AU6
V8	Tuning Indicator	EM80/6BR5
V9	AF Amplifier	ECC82/12AU7A
V10	Rectifier	6X4

* Alternate

① Serial numbers before 30549 use 6U8 for FM-AM RF Amplifier. V3 (6BA6) is not used.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	H. H. SCOTT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	250	CEC-4X40-250			FP327.89	TMQ-116	TVAS-4581 *	
B	40	250				TC58			
C	40	250							
D	40	250							
C2	25	25	CET25/25	PRS1260	BBR25-25	TC26	TD-25-25	TVA-1205	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	5 NPO		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C4	47 NPO		NPO-DI 47	DTZ-47	C10Q47	CCTO-470	CNO-447	10TCC-Q47
C5	4700	(1000mmf)†	BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C6	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C7	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C8	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C9	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C10	15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C11								
C12	15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C13	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C14	2.2 10%		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C15	1-8							
C16	10 NPO		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C17	15 N750 10%		N750-DI 15	DTN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C18	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C19	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C20	5 NPO		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C21	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C22	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C23	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C24	47 NPO		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C25	10 N1500	(8.2mmf)†				*		
C26	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C27	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C28	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C29	3.3 10%		NPO-SI 3.3	TCZ-3R3	C10V33C	CCTO-3R3	CNO-533	10TCC-V33
C30	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C31	10 NPO		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C32	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C33	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C34	.22 10%							
C35	3.3 10%		NPO-SI 3.3	TCZ-3R3	C10V33C	CCTO-3R3	CNO-533	10TCC-V33
C36	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C37	100		1469-0001	TCZ-100	22R5T1	CM-19B-101K	MC235	MS-310
C38	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C39	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C40	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C41	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C42	.22							
C43	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C44	47 NPO		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C45	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C46	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C47	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C48	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C49	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C50	330 10%		1469-00033	DD-331	5R5T33	CM-19B-331K	MCB241	MS-333
C51	330 10%		1469-00033	DD-331	5R5T33	CM-19B-331K	MCB241	MS-333
C52	270 10%		1469-00027	DD-271	5R5T27	CM-19B-271K	MCB240	MS-327
C53	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C54	.0033 400V		P488N-0033	D6-332	CUB6D33	6DP-1-332	GEM-6233	6TM-D33
C55	.0082 400V		P684CM-0082	DD-822	ST16D82	6DP-2-822	GEM-6282	5BF-D82
C56	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C57	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C58	15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C59	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C60	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C61	.033 400V		P488N-033	DD-302	CUB4S33	4DP-2-333	GEM-4133	4TM-S33
C62	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C63	.047 400V	(.02mfd)†	P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C64	20000 1400V				CUB16S2	16DP-4-203	GEM-1612	MB-S2

† Alternate Value.

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	H. H. SCOTT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	RCV-500K-3FA	B-59	A47-500K-S	Q11-133	U50	Level
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2	1500Ω	2(WW)	RWV-1.5K		39-1500	112-1500	FL-1.5K	10KC Filter

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	6800Ω	
R4	4.7meg	
R5	100K	
R6	1meg	
R7	10K 2W	
R8	10K 2W	
R9	270Ω	
R10	390Ω	
R11	1meg	
R12	390Ω	
R13	10K	
R14	10K	
R15	1meg	
R16	68Ω	
R17	10K 2W	
R18	10K 2W	
R19	18Ω	(10Ω) *
R20	18Ω	(10Ω) *
R21	22K	
R22	10K	
R23	220Ω	

* Alternate.

ITEM No.	RATING	REMARKS
R24	100K	
R25	4700Ω 1W	
R26	220Ω	
R27	2.2meg	
R28	220K	
R29	22meg	
R30	680K	
R31	33K	
R32	47K	
R33	1meg	
R34	47K	
R35	22K 1W	
R36	18K	Note 1
R37	27K	
R38	150Ω	
R39	1200Ω	
R40	1800Ω	
R41	6800Ω	
R42	6800Ω	
R43	47K	
R44	39K	

ITEM No.	RATING	REMARKS
R45	2200Ω	
R46	1meg	
R47	1meg	
R48	47K 1W	
R49	1000Ω	
R50	270K	
R51	2700Ω	
R52	180K	
R53	100K	
R54	22K	
R55	100K	
R56	22K	
R57	750Ω 4W	
R58	220Ω 1W	
R59	220Ω 1W	
R60	1000Ω	
R61	10Ω	
R62	3.3Ω 1W	
R63	33K	Note 1

Note 1. Not used in all versions.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		H. H. SCOTT PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Antenna Trans.							
L2	RF Choke							1.2uh
L3	RF Choke		19-2004	19-2004		4586		.33uh
L4	RF Choke	L-RFC-1.0	19-1000	19-1000	BC-561	4602		1uh
L5	Fil. Choke	L-RFC-1.0	19-1000	19-1000	BC-561	4602		1uh
L6	FM RF Coil							
L7	FM Osc. Coil							
L8	Fil. Choke	L-RFC-1.0	19-1000	19-1000	BC-561	4602		1uh
L9	1st FM IF Trans.	TRV-10.7-IF	16-3487	16-3487	FM-254	1463		
L10	Loopstick	Z-AM-ANT						
L11	AM Antenna Trans.	TRV-AM-A1						
L12	AM RF Trans.	TRV-MM-M						
L13	AM Osc. Coil				BC-393	70-OSC		Tap @ .7Ω
L14	1st AM IF Trans.	TRV-.455D	16-6758	16-6758	BC-352	12-C1	RF-1	
L15	RF Choke	L-RFC-80	19-3075	19-3075	TV-186	6172	VP-2	80uh
L16	2nd FM IF Trans.	TRV-10.7-IF	16-3487	16-3487	FM-254	1463		
L17	2nd AM IF Trans.	TRV-.455D	16-6758	16-6758	BC-353	12-C2	RF-2	
L18	3rd FM IF Trass.	TRV-10.7-IF	16-3487	16-3487	FM-254	1463		
L19	RF Choke	L-RFC-1.0	19-1000	19-1000	BC-561	4602		1uh
L20	Fil. Choke	L-RFC-1.0	19-1000	19-1000	BC-561	4602		1uh
L21	Ratio Det.	TRV-10.7D	17-3498	17-3498	FM-255	1465		
L22	10KC Filter	TRV-.01-T						
L23	Fil. Choke	L-RFC-1.0	19-1000	19-1000	BC-561	4602		1uh

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KN-P-8	Tuning, Level, Selector
Dial Pointer	A-P-SR	
Dial Glass	N-320-2	

WIRING DATA

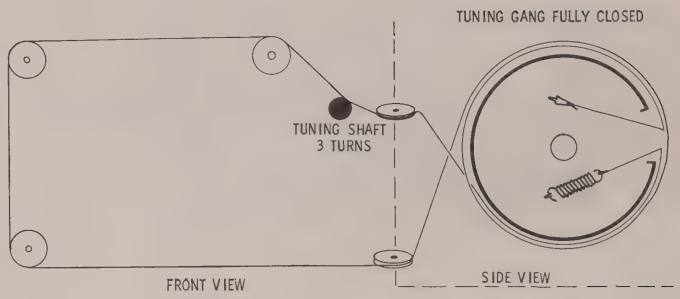
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	H. H. SCOTT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .31A	360VCT @ .020A	5V @ .3A	TR-6-2						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 3.5A									

DIAL CORD STRINGING



CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES	
		H. H. SCOTT PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.		
M1	1N294	D-1N294	1N60	1N294	1N294	FM Detector, Pigtail	Matched
M2	1N294	D-1N294	1N60	1N294	1N294	FM Detector, Pigtail	Pair

MISCELLANEOUS

ITEM No.	PART NAME	H. H. SCOTT PART No.	NOTES
M3	Tuning Cap.		6 Gang, AM Sections: Ant. 100-284mmf, RF 17-285mmf, Osc. 17-120mmf
M4	Switch		Function Selector
M5	Switch		Normal-Multiplex (DPDT, Slide Type)

PHOTOFACT® Folder with CIRCUITRACE®

SILVERTONE MODELS 73, 74, 75 (Ch. 528.53570, .59450, 451, 470)

SILVERTONE MODELS 73, 74, 75 (Ch. 528.53570, .59450, 451, 470)

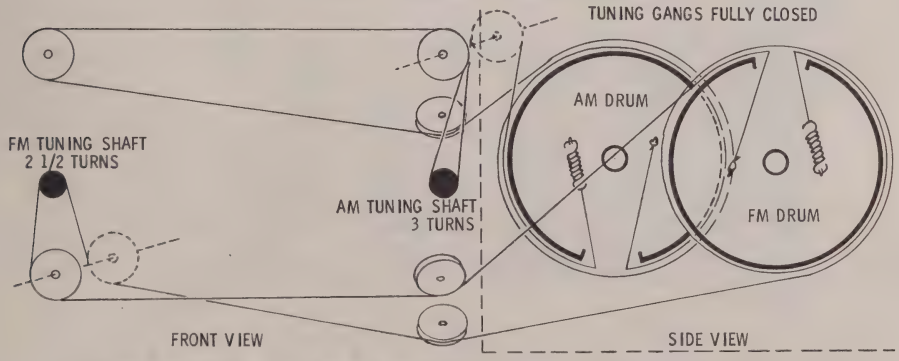
MODEL 73

SILVERTONE MODELS 73, 74, 75 (Ch. 528.53570, .59450, 451, 470)

TRADE NAME	Silvertone Models 73, 74, 75 (Chassis: Tuner 528.53570, Preamp. 528.59470, Amp. 528.59450 or 528.59451)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC Operated 9 Tube FM-AM Tuner, 2 Tube Stereo Preamplifier, 7 Tube Stereo Amplifier and 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 165 Watts, 1.6 Amp. @ 117 Volts AC
TUNING RANGE	BROADCAST 532 - 1630KC FREQ. MOD. 88 - 108MC

FOR SERVICE INFORMATION ON RECORD CHANGER 528.56780 or 528.56781 - SEE SIMILAR SILVERTONE 528.56310 - PHOTOFACT SET 417 FOLDER 10

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JN686

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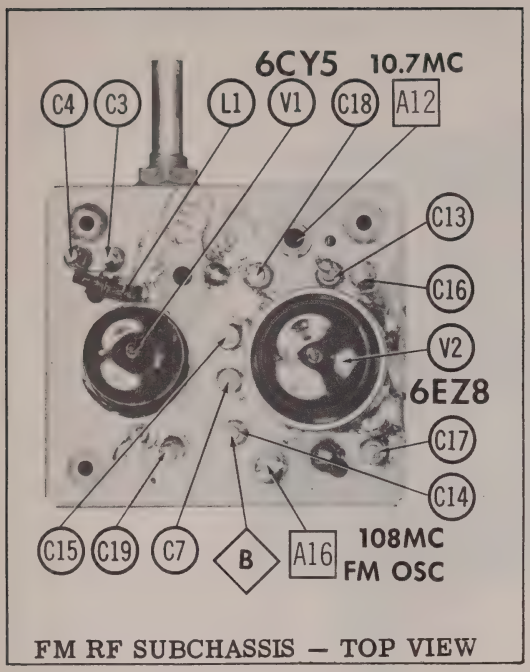
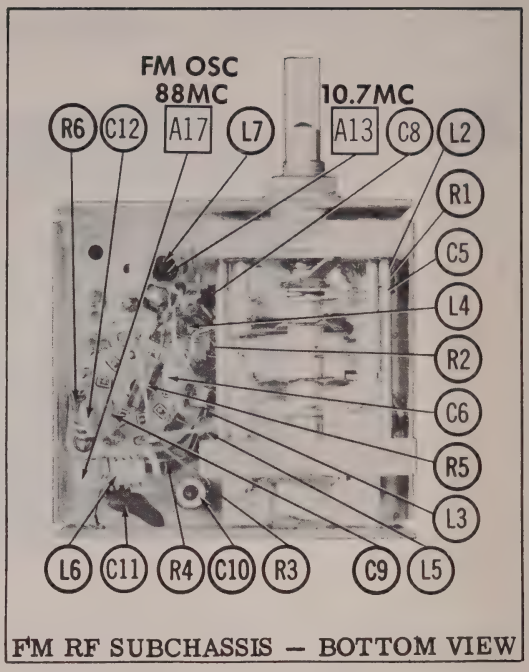
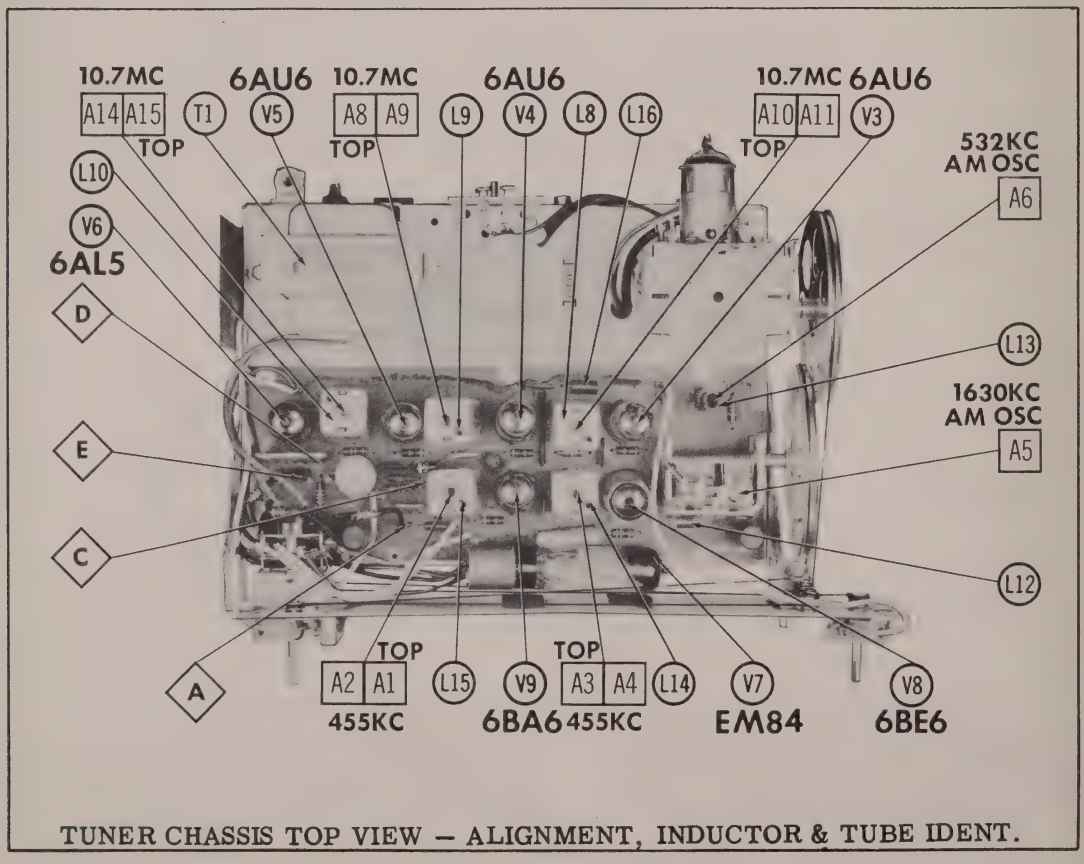


FM RF SUBCHASSIS — TOP VIEW



FM RF SUBCHASSIS — BOTTOM VIEW



TUNER CHASSIS TOP VIEW — ALIGNMENT, INDUCTOR & TUBE IDENT.

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:

A1 thru A4, A8 thru A15 ...	GENERAL CEMENT #5097, 8727 WALSCO #2515
A5, A7, A16	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A6	GENERAL CEMENT #8282, 8606, 8606L, 9295 WALSCO #2526, 2543, 2544, 2545
A17	GENERAL CEMENT #8282, 8606, 8606L, 9091 WALSCO #2526, 2541, 2543, 2544

AM ALIGNMENT - SELECTOR SWITCH IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .1mfd to AM antenna stator lug of tuning gang. Low side to chassis.	455KC (400∿ Mod)	AM. Tuning gang fully open.	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	Loop	1630KC	AM. Tuning gang fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum deflection.
3.	"	535KC	AM. Tuning gang fully closed.	"	A6	Adjust for maximum deflection. Repeat steps 2 and 3 until no further improvement is noted.
4.	"	1400KC	AM. 1400KC	"	A7	Adjust for maximum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR SWITCH IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .01mfd to point (B). Low side to chassis.	10.7MC (Unmod)	FM. Point of non-interference	DC probe to point (C). Common to chassis.	A6, A9 A10, A11, A12, A13	Adjust for maximum deflection.
6.	"	"	"	DC probe to point (D). Common to chassis.	A14	"
7.	"	"	"	DC probe to point (E). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR SWITCH IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .01mfd to point (B). Low side to chassis.	10.7MC (450KC Swp)	FM. Point of non-interference	Vert. Amp. to point (C). Low side to chassis.	A8, A9, A10, A11 A12, A13	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A14	"
7.	"	"	"	Vert. Amp. to point (E). Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - SELECTOR SWITCH IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	Across FM antenna terminals.	108MC (Unmod)	FM. 108MC	DC probe to point (C). Common to chassis.	A16	Adjust for maximum deflection.
9.	"	88MC	FM. 88MC	"	A17	Adjust for maximum deflection. Repeat steps 8 and 9.

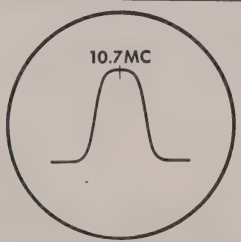


FIG. 1

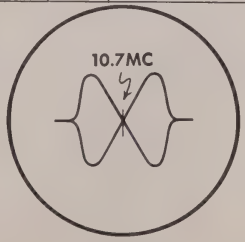


FIG. 2

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆	GENERAL ELECTRIC ◆		RAYTHEON ◆	SYLVANIA ◆	
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amplifier	6CY5	V5	FM Limiter	6AU6
V2	FM Mixer - FM Osc. - FM AFC	6EZ8	V6	Ratio Detector	6AL5
V3	1st FM IF Amplifier	6AU6	V7	Tuning Indicator	EM84/6FG6
V4	2nd FM IF Amplifier	6AU6	V8	AM Converter	6BE6
			V9	AM IF Amplifier	6BA6

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	150	18-57-3	AFH3-11-40‡	XC0123	FP330.9	TMQ-136	TVL-3443.2	
B	■60	150							
C	▲60	150							
C2	8	50	18-98-5	BCD-50008	BBR8-150	TC41	TD-8-150	TVA-1405	

‡Use MW-4 washer.

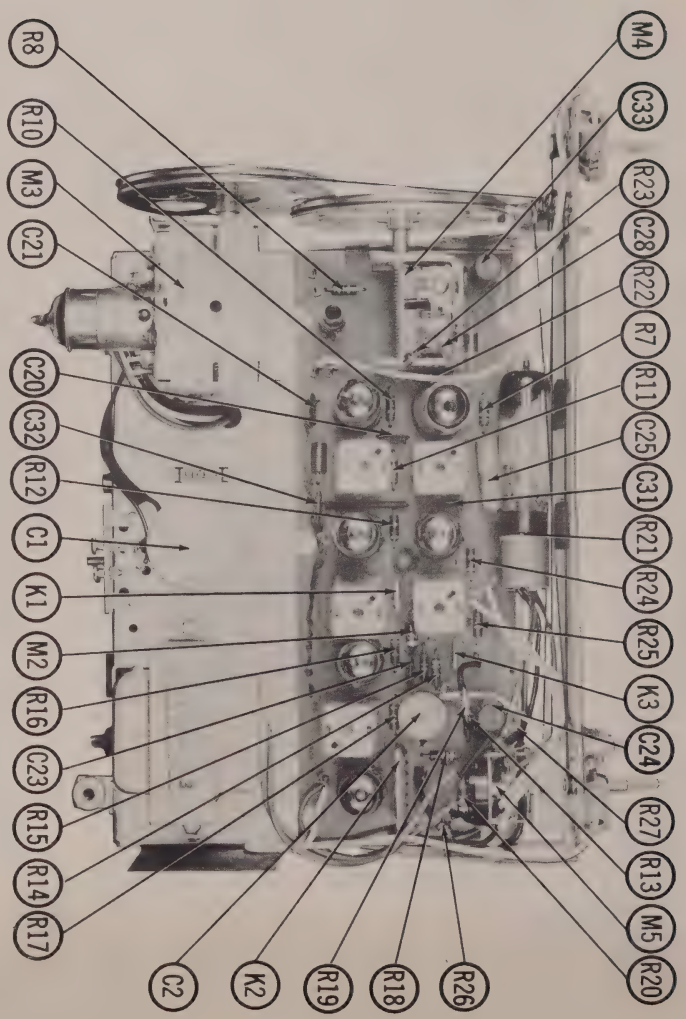
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	180		#277-181						
C4	1.5		#274-159						
C5	15			DI-15	DD-150	L10Q15	CCD-150	GP415	10TS-Q15
C6	8			NPO-DI 8.2	DD-080	C10V8C			10TCC-V82
C7	33		#275-330						
C8	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C9	33			DI-33	DD-330	L10Q33	CCD-330	GP433	10TS-Q33
C10									
C11	500	10%		1469-0005	DD-501	5R5T5	CM-20B-501K	MCB245	MS-35
C12	15			DI-15	DD-150	L10Q15	CCD-150	GP415	10TS-Q15
C13	1.5		#274-159						
C14	1000			EF-001	MFT-1000		CCF-001	CT280A	
C15	1000			EF-001	MFT-1000		CCF-001	CT280A	
C16	1000			EF-001	MFT-1000		CCF-001	CT280A	
C17	1.5		#274-159						
C18	1000			EF-001	MFT-1000		CCF-001	CT280A	
C19	1000			EF-001	MFT-1000		CCF-001	CT280A	
C20	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C21	5000		(10000mmf) ◆	BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C22	20000			BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C23	10000		(5000mmf) ◆	BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C24	.047	200V		P2151N-047	DD-503	BC2847J	4DP-3-473	ACE6147	2SE-S47
C25	.22	100V		P288N-22		CUB2P22	1DP-3-224	GEM-2022	2TM-P22
C26	6.8		#20-7-3	NPO-SI 6.8	TCZ-6R8				
C27			#19-180-0						
C28	10000		Note 1	BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C29	20000		Note 1	BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C30	20000		Note 1	BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C31	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C32	5000			BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C33	.047	200V		P2151N-047	DD-503	BC2847J	4DP-3-473	ACE6147	2SE-S47

Silvertone Part Number. ◆ Alternate Value.
Note 1. Not used in some versions.

TUNER CHASSIS—TOP VIEW



TUNER PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	330K	
R2	56K	
R3	330K	
R4	3300Ω	
R5	8200Ω	
R6	470Ω	
R7	100K	
R8	560Ω	
R9	1000Ω	
R10	82Ω	

ITEM No.	RATING	REMARKS
R11	1000Ω	Note 1
R12	82Ω	
R13	3.3meg	
R14	3.3meg	
R15	10K	
R16	82Ω	
R17	10meg	
R18	470K	
R19	470K	
R20	47K	

ITEM No.	RATING	REMARKS
R21	560K	
R22	18K	
R23	2.2meg	Note 1
R24	82Ω	
R25	2.2meg	
R26	470K	
R27	47K	
R28	390Ω 1W	
R29	390Ω 1W	

Note 1. Not used in some versions.

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	SILVERTONE PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.050A	86-22-3 ①	RS065 ①	1234AH ①	65 ①	SR200 ②	① Selenium Type ② Silicon Type

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		SILVERTONE PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N541	86-5-1	1N636	1N60	1N60	AM Detector

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K1	FM Limiter Grid Filter	100mmf, 47K	13-2-2	
K2	Ratio Det. Network	(3) 300mmf, 68Ω, 1000Ω, 1500Ω, (2) 6800Ω, 68K	13-35-3	Aerovox PA-694 Centralab PC-342
K3	AM Audio Filter	100mmf, 100mmf, 47K	13-3-2	Aerovox PA-97 Centralab PC-50 Cornell-Dubilier 111TM1 Sprague D-1

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	FM Tuner	95-200-0	Complete
M4	Tuning Cap.	19-84-2	2 Gang, AM
M5	Switch	69-293-0	Function
	Printed Board	25-22-1	Less Tubes

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		SILVERTONE PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Antenna Coil	3191-1						
L2	RF Choke	301-15						
L3	RF Choke	3190-24						
L4	RF Choke	317-4						
L5	RF Choke	301-11						
L6	FM Osc. Coil	3197-2						
L7	1st FM IF	3193						
L8	2nd FM IF	10-117-2	16-3490	16-3490		1463-PC		
L9	3rd FM IF	10-118-2	16-3490	16-3490		1463-PC		
L10	Ratio Detector	19-29-0	17-3492	17-3492		1465-PC		
L11	Loop Antenna	82-13-1						
L12	AM Antenna Coil	①						
L13	AM Osc. Coil	10-55-4						
L14	1st AM IF	10-116-2	16-6780	16-6780	BC-356	13-PC1	RF-4	
L15	2nd AM IF	10-116-2	16-6780	16-6780	BC-357	13-PC2	RF-4	
L16	Fil. Choke	10-28-0						

① Not used in some versions.

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

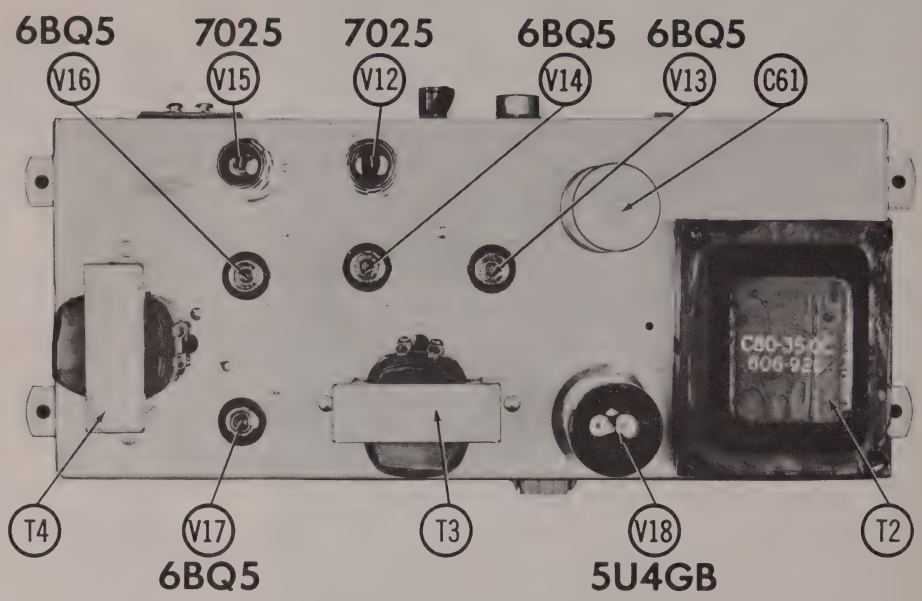
NAME	PART NO.	DESCRIPTION
Knob	52-1264-0	AM Tuning, Amplifier Function Selector
Knob	52-1265-0	FM Tuning, Treble, Bass, Loudness
Knob	52-1263-0	Stereo Balance, Bass, Treble, Radio Function Selector
Knob	52-1237-0	Off-On Reject (Part of Changer)
Knob	52-1238-0	Speed Control (Part of Changer)
Knob	52-1251	Unstacking Control (Part of Changer)
Cabinet	42-124-3	Model 73
Cabinet	42-126-3	Model 74
Cabinet	42-125-3	Model 75
Handle	49-538	Models 73 and 75 (3 used)
Handle	49-539	Model 74 (3 used)
Dial Pointer	52-215-1	2 used
Dial Window	48-171-1	

TRANSFORMER (POWER)

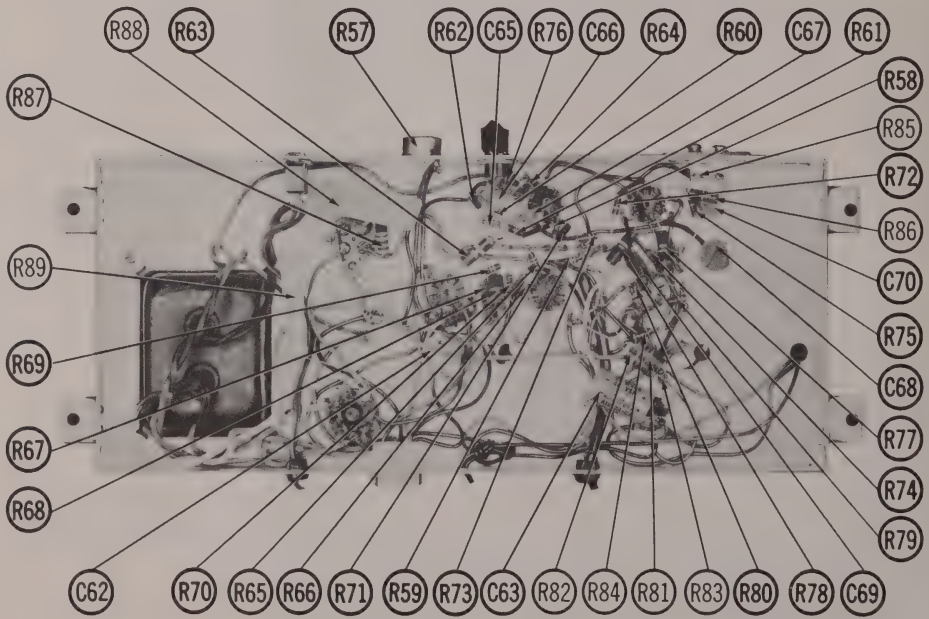
ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ② .36A	118V ② .050A	6.3V ② 2.9A	80-37-0		P-3045				

WIRING DATA

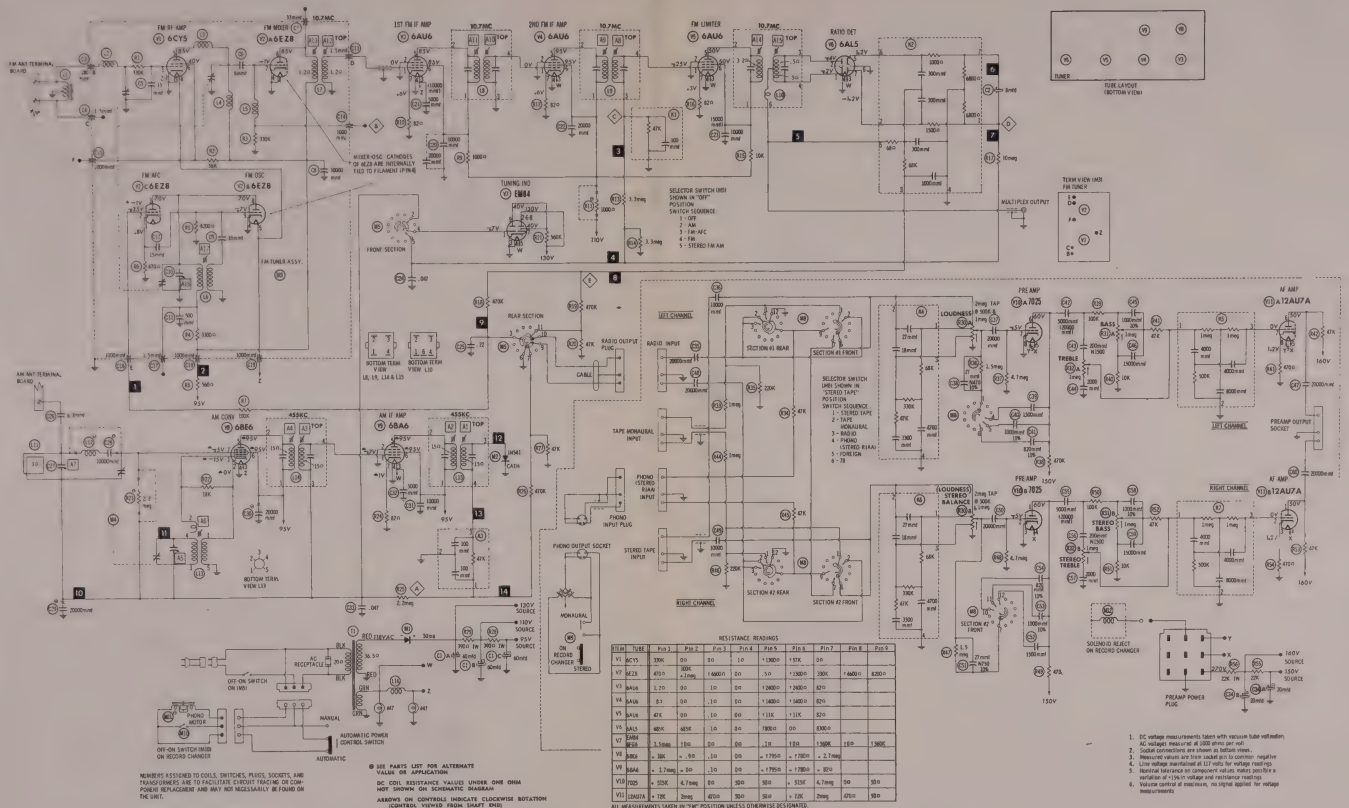
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1785-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



AMP. CHASSIS – TOP VIEW



AMP. CHASSIS – BOTTOM VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CY5	330K	0Ω	0Ω	10	+130Ω	+15K	0Ω		
V2	6EZ8	470Ω	330K	+2.5meg	+660Ω	0Ω	10	+130Ω	330K	+660Ω 820Ω
V3	6AU6	1.2Ω	0Ω	10	0Ω	+240Ω	+240Ω	820		
V4	6AU6	8.9	0Ω	10	0Ω	+140Ω	+140Ω	820		
V5	6AU6	47K	0Ω	10	0Ω	+11K	+11K	820		
V6	6AL5	680K	685K	10	0Ω	780Ω	0Ω	8300Ω		
V7	EM84	1.5meg	10Ω	0Ω	0Ω	10	10Ω	+560K	10Ω	+560K
V8	6BE6	+ 3MΩ	+ 9Ω	10	0Ω	+ 77Ω	+ 78Ω	+ 2.7meg		
V9	6BA6	+ 2.7meg	+ 8Ω	10	0Ω	+ 77Ω	+ 78Ω	+ 8Ω		
V10	7025	525K	4.7meg	0Ω	30Ω	30Ω	+ 525K	4.7meg	0Ω	30Ω
V11	12AU7A	+ 72K	2meg	470Ω	30Ω	30Ω	+ 72K	2meg	470Ω	30Ω

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
- MEASURED IN "AM" POSITION.
- MEASURED FROM OUTPUT OF ML.
- MEASURED IN "FM-MPX" POSITION.
- MEASURED FROM PIN 7 OF V10.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 ohms per volt.
3. Socket connections are shown as bottom views.
4. Measured values are from socket pin to common negative.
5. Line voltage maintained at 117 volts for voltage readings.
6. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
7. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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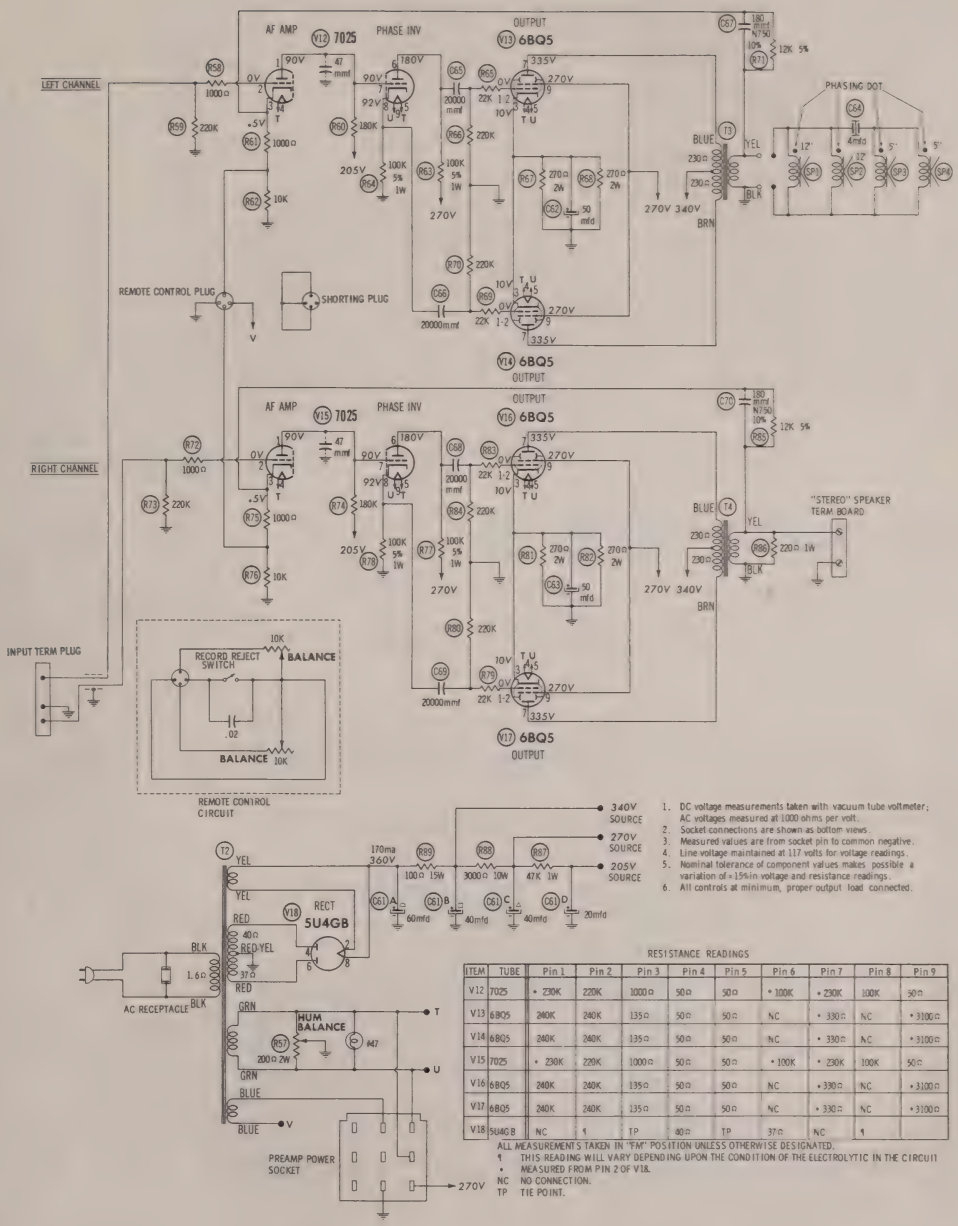
SILVERTONE MODELS 73, 74, 75 (Ch. 528.53570, .59450, 451, 470)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V12	7025	• 230K	220K	1000Ω	50Ω	50Ω	• 100K	• 230K	100K	50Ω
V13	6BQ5	240K	240K	135Ω	50Ω	50Ω	NC	• 330Ω	NC	• 3100Ω
V14	6BQ5	240K	240K	135Ω	50Ω	50Ω	NC	• 330Ω	NC	• 3100Ω
V15	7025	• 230K	220K	1000Ω	50Ω	50Ω	• 100K	• 230K	100K	50Ω
V16	6BQ5	240K	240K	135Ω	50Ω	50Ω	NC	• 330Ω	NC	• 3100Ω
V17	6BQ5	240K	240K	135Ω	50Ω	50Ω	NC	• 330Ω	NC	• 3100Ω
V18	5U4GB	NC	¶	TP	80Ω	TP	37Ω	NC	¶	

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT
• MEASURED FROM PIN 2 OF V18.
NC NO CONNECTION.
TP TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1960

SILVERTONE MODELS 73, 74, 75 (Ch. 528.53570, .59450, 451, 470)

PRE AMP PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V10	Left Channel Preamp. - Right Channel Preamp.	7025	V11	Left Channel AF Amp. - Right Channel AF Amp.	12AU7A

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C34A	▲20	350	18-58-3	AFH2-69	B0500	FP237	TMD-61	TVL-2935	
B	▲20	350							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C35	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C36	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C37	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C38	27 N470 10%	#15-27111				*		
C39	1500		BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C40	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C41	820 10%		DI-820	DD-821	1R5T82	CCD-821	GP382	10TS-T82
C42	5000	(20000mmf) ♦	BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C43	200 N1500	#15-20111				*		
C44	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C45	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C46	15000		BPD-015	DD-153	BYA10S15	CCD-153	GP115	5HK-S15
C47	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C48	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C49	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C50	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C51	27 N750 10%		N750-DI 25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C52	1500		BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C53	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C54	820 10%		DI-820	DD-821	1R5T82	CCD-821	GP382	10TS-T82
C55	5000	(20000mmf) ♦	BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C56	200 N1500	#15-20111				*		
C57	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C58	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C59	15000		BPD-015	DD-153	BYA10S15	CCD-153	GP115	5HK-S15
C60	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20

Silvertone Part Number. ♦ Alternate Value.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R30A	2meg *		24-358-0					Loudness, Left Channel
B	2meg *							Stereo Balance, Right Chan.
R31A	1meg		24-203-2	F1-52		† QJ1132R	■ UE4068	Bass, Left Channel
B	1meg			R2-52				Stereo Bass, Right Channel
R32A	1meg		24-202-2	F1-54		† QJ1132R	■ UE4068	Treble, Left Channel
B	1meg			R2-54				Stereo Treble, Right Chan.

* Taps @ 500K and 1meg.
† "Concentrikit" equivalent: K-6 Kit with base elements and shafts: B13-137, P17-028 (Panel)
(Not available as a factory assembled unit) B13-137, R9-110 (Panel)
■ "STA-LOC" equivalent: FA16A, RU16A, OS875A, IS1375.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R33	1meg	
R34	47K	
R35	220K	
R36	1.5meg	
R37	4.7meg	
R38	470K	
R39	100K	
R40	10K	

ITEM No.	RATING	REMARKS
R41	47K	
R42	47K	
R43	470Ω	
R44	1meg	
R45	47K	
R46	220K	
R47	1.5meg	
R48	4.7meg	

ITEM No.	RATING	REMARKS
R49	470K	
R50	100K	
R51	10K	
R52	47K	
R53	47K	
R54	470Ω	
R55	22K	
R56	22K 1W	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K4	Loudness Compensator	18mmf, 27mmf, 3300mmf, 4700mmf, 47K, 68K, 330K	13-19-3	
K5	Rumble Filter	(2) 4000mmf, 8000mmf, 500K, (2) 1meg	13-37-3	
K6	Loudness Compensator	18mmf, 27mmf, 3300mmf, 4700mmf, 47K, 68K, 330K	13-19-3	
K7	Rumble Filter	(2) 4000mmf, 8000mmf, 500K, (2) 1meg	13-37-3	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA SILVERTONE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE
M6	33-314-0 (5726)	13TB	Not Req.	66 ♦	Not Req.			8TA4-S	N-8TA-S

♦ Use mount PT-3

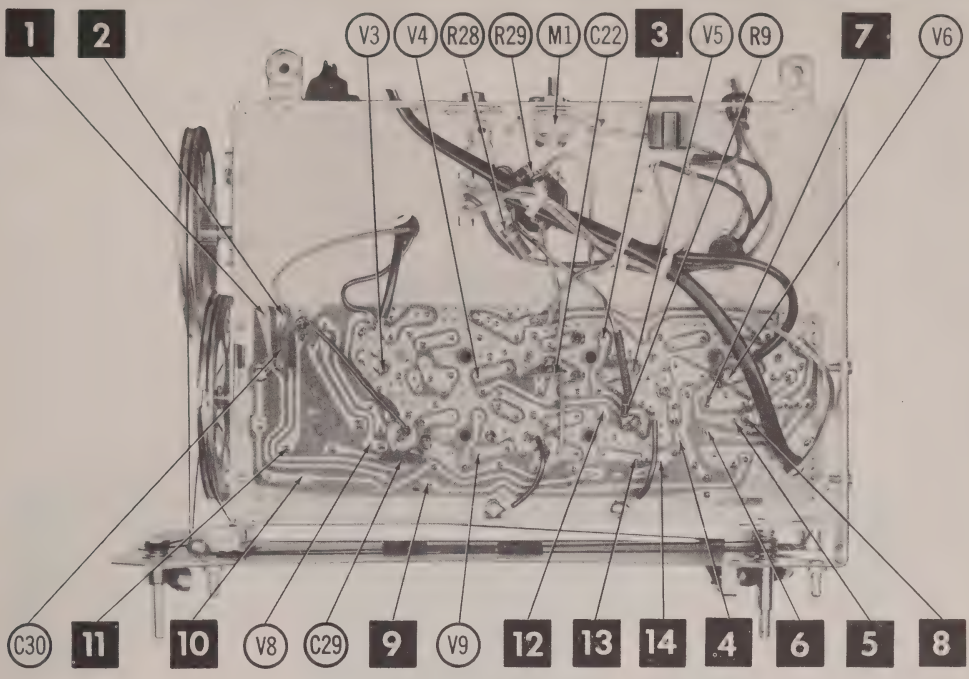
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA SILVERTONE PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	REMARKS
M7	83-1308 (5776)	W-103STS † or W-103STD ♦	S-7IX † or S-7IXSD †♦ or S-7IXDD ♦	† Jewel ♦ Diamond

MISCELLANEOUS

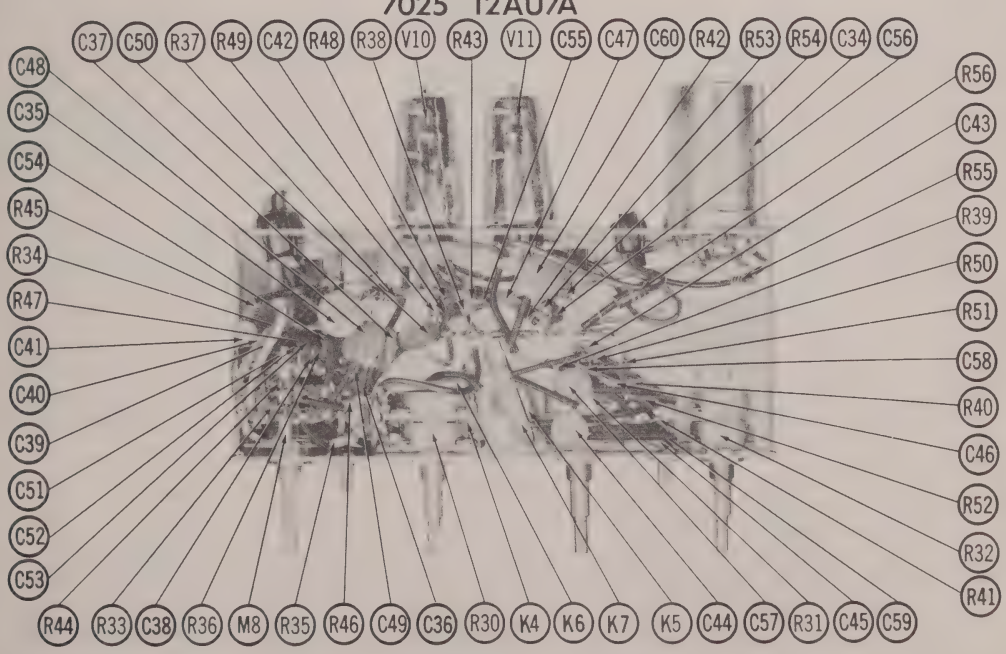
ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M8	Switch	69-298-0	Selector
M9	Switch	69-282-0	Stereo-Monaural (Part of Changer) (SPDT Slide)
M10	Switch	84-7838	Off-On (Part of Changer)
M11	Motor	59-72	Turntable Drive (Part of Changer Ch. 528.56780)
	Motor	59-89	Turntable Drive (Part of Changer Ch. 528.56781)
M12	Solenoid	27-74-2	Reject. (24V)



A Howard W. Sams CIRCUITRACE* Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

TUNER CHASSIS — BOTTOM VIEW



PREAMP. CHASSIS

AMP PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (CBS / GENERAL ELECTRIC / RAYTHEON / SYLVANIA)
V12	Left Channel AF Amp. - Phase Inverter	7025
V13	Left Channel Output	6BQ5
V14	Left Channel Output	6BQ5
V15	Right Channel AF Amp. - Phase Inverter	7025
V16	Right Channel Output	6BQ5
V17	Right Channel Output	6BQ5
V18	Rectifier	5U4GB

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C61A	▰60	450	18-55-3	AFH4-93-50	C0365	FP376.9	TMT-193	TVL-3791	
B	■40	450			BR4035	TC795	TD-40-350	TVA-1611	
C	▲40	350							
D	20	300							
C62	50	25	18-23-0	PRS1265	BBR50-25	TC29	TD-50-25	TVA-1206	
C63	50	25	18-23-0	PRS1265	BBR50-25	TC29	TD-50-25	TVA-1206	
C64	4	150NP	18-9-5	NP-PRS7750	BBR8-150 †	TCN510		TVAS-1402.1*	

† Use 2 units. Connect negative terminals together.
Connect positive terminals into circuit the same as the original non-polarized unit.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C65	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C66	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C67	180 N750 10%		N750-DI 200	TCN-180	C10T18U	CCTN-201	CN7-318	10TCU-T18
C68	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C69	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C70	180 N750 10%		N750-DI 200	TCN-180	C10T18U	CCTN-201	CN7-318	10TCU-T18

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R57	200Ω	2(WW)	24-1-3				FL200P	Hum Balance

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R58	1000Ω	
R59	220K	
R60	180K	
R61	1000Ω	
R62	10K	
R63	100K 5% 1W	
R64	100K 5% 1W	
R65	22K	
R66	220K	
R67	270Ω 2W	
R68	270Ω 2W	
R69	22K	
R70	220K	
R71	12K 5%	
R72	1000Ω	
R73	220K	
R74	180K	
R75	1000Ω	
R76	10K	
R77	100K 5% 1W	
R78	100K 5% 1W	
R79	22K	
R80	220K	
R81	270Ω 2W	
R82	270Ω 2W	
R83	22K	
R84	220K	
R85	12K 5%	
R86	220Ω 1W	
R87	47K 1W	
R88	3000Ω 10W	
R89	100Ω 15W	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	117V	680VCT @ .170A	5V @ 3A	24V @ .2A	6.3V @ 4.2A		80-35-1						
	@ 1.3V												

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	6400Ω	8Ω	80-106-1	24S43	A-2905	AU-609 ①	A-3880	24S43	S-55X ①	① Drill new mounting hole
T4	6400Ω	8Ω	80-106-1	24S43	A-2905	AU-609 ①	A-3880	24S43	S-55X ①	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA SILVERTONE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	12"	PM	14-16Ω	33-423-4	12A6AZ16	
SP2	12"	PM	14-16Ω	33-423-4	12A6AZ16	
SP3	5"	PM	6-8Ω	33-431-4	5A1Z716	
SP4	5"	PM	6-8Ω	33-431-4	5A1Z716	

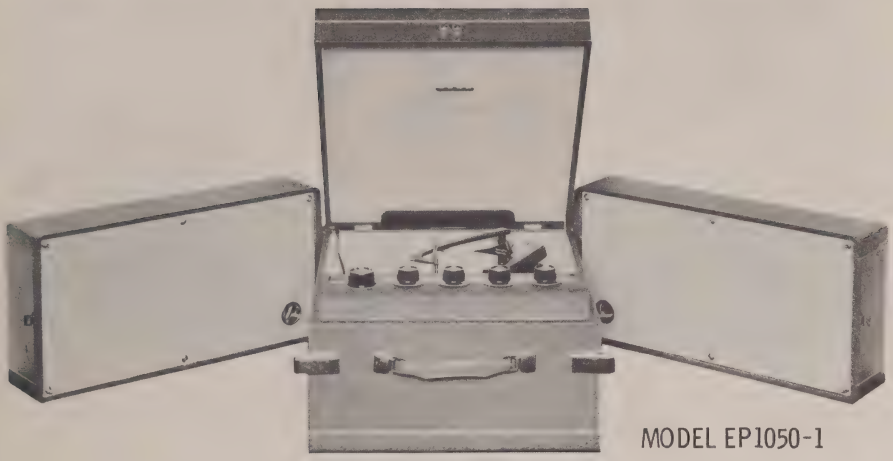
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

WEBCOR MODELS
EP1050-1, -1A (Ch. 14X310-1)

WEBCOR MODELS
EP1050-1, -1A (Ch. 14X310-1)



MODEL EP1050-1

WEBCOR MODELS
EP1050-1, -1A (Ch. 14X310-1)

TRADE NAME	Webcor Models EP1050-1, EP1050-1A (Ch. 14X310-1)
MANUFACTURER	Webcor Inc., 5610 W. Bloomingdale Ave., Chicago 39, Illinois
TYPE SET	AC Operated 5 Tube Stereo Phono Amplifier with 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 64 Watts, .63 Amp. @ 117 Volts AC (less motor)

RECORD CHANGER E184-29 USED IN MODEL EP1050-1A.
RECORD CHANGER E168-29 USED IN MODEL EP1050-1. FOR SERVICE INFORMATION ON THIS UNIT, REFER TO SIMILAR WEBCOR 171 - PHOTOFACT SET 447 FOLDER 13.

SET 481 FOLDER 13

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JT562

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PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel 1 AF Amp.	7025 (12AX7) *	V4	Channel 2 Output	6BQ5
V2	Channel 1 Output	6BQ5	V5	Rectifier	5Y3GT
V3	Channel 2 AF Amp.	7025 (12AX7) *			

* Alternate.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA WEBCOR PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲35	375	30P306	AFH4-79	D0150	FP421.4	TMQ-96	TVL-4771	
B	■35	375			BBR25-25			TVA-1205	
C	▲15	350							
D	25	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C3	330		DI-330	DD-331	L10T33	CCD-331	B-333	5GA-T33
C4	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C5	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C7	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C9	330		DI-330	DD-331	L10T33	CCD-331	B-333	5GA-T33
C10	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C11	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C12	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C13	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C14	2mfd 25V		P123ZNN-2.0		MP2W2			118P20502S2
C15	2mfd 25V		P123ZNN-2.0		MP2W2			118P20502S2

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WEBCOR PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg		31P156	B-76	AD47-2meg-Z	Q13-139	■ UE1877	Volume, Channel 1
B	2meg			SR-76	Not Req.	M13-139		Volume, Channel 2
C	Shaft			Not Req.	FS-3	Not Req.		
R2A	1meg		31P158	B-69	A47-1meg-S	Q11-137	U54	Stereo Balance
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1meg		31P157	B-70	AD47-1meg-Z	Q13-137		Bass, Channel 2
B	1meg			SR-70	Not Req.	M13-137	▲ UE3913	Bass, Channel 1
C	Shaft			Not Req.	FS-3	Not Req.		
R4A	1meg		31P157	B-70	AD47-1meg-Z	Q13-137		Treble, Channel 2
B	1meg			SR-70	Not Req.	M13-137	▲ UE3913	Treble, Channel 1
C	Shaft			Not Req.	FS-3	Not Req.		

■ "STA-LOC" Equivalent: FA26A, RU26A, CS3500. ▲ "STA-LOC" Equivalent: FA16A, RU16A, CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

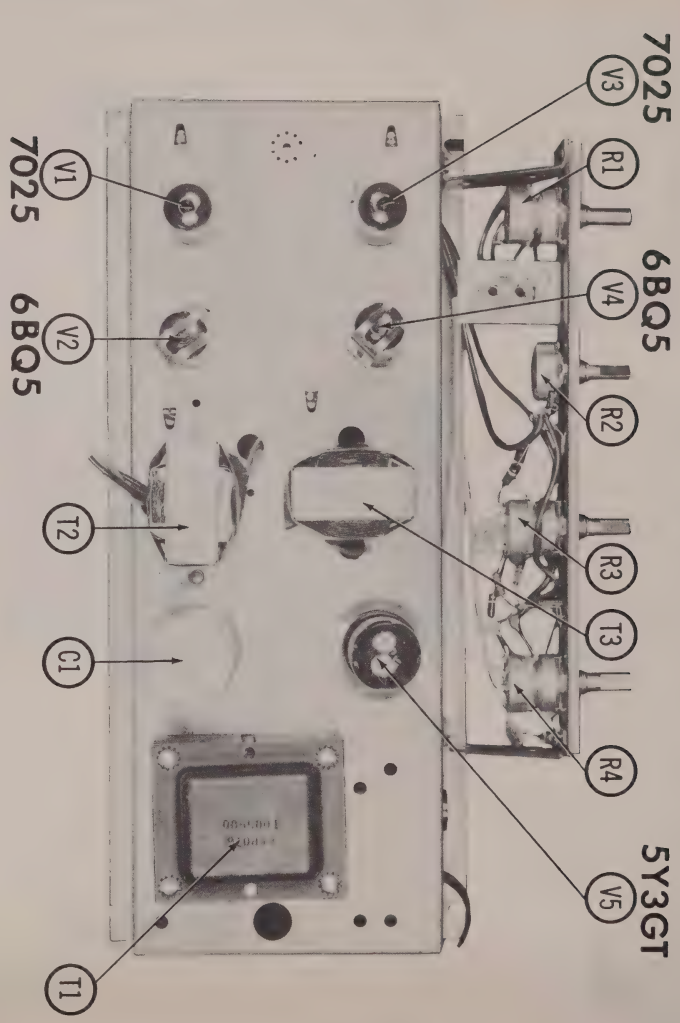
ITEM No.	RATING	REMARKS
R5	100K	
R6	2700Ω	
R7	120K	
R8	27K	
R9	100K	
R10	100K	
R11	3300Ω	

ITEM No.	RATING	REMARKS
R12	18K	(33K)*
R13	470K	
R14	82Ω 5W	(95Ω)*
R15	100K	
R16	2700Ω	
R17	120K	
R18	27K	

ITEM No.	RATING	REMARKS
R19	100K	
R20	100K	
R21	3300Ω	
R22	18K	(33K) *
R23	470K	
R24	2200Ω 1W	
R25	10K	

* Alternate value.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	WEBCOR PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .63A	560VCT @ .080A	5V @ 2A	68P076						
	SEC. 3	SEC. 4	SEC. 5							
	12.6VCT @ 1.2A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	WEBCOR PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5100Ω	6-8Ω	67P076	24S64	A-2902	AU-604	A-3337	24S64	S-53X	
T3	5100Ω	6-8Ω	67P076	24S64	A-2902	AU-604	A-3337	24S64	S-53X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	WEBCOR PART No.	QUAM PART No.	
SP1	6"	PM	6-8Ω	76P090-1 *	6A1Z8.3	* Alternate Part #76P090
SP2	4"	PM	3-4Ω	76P077-1	4A1	
SP3	6"	PM	6-8Ω	76P090-1 *	6A1Z8.3	
SP4	4"	PM	3-4Ω	76P077-1	4A1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA								
	WEBCOR PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M1	21P586	13T	Not Req.	13	Not Req.			8TA4-S	N-8TA-S

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	WEBCOR PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M2		W-204DS * † ♦ or W-204DD-1 * ♦	A44X * † or A44XSD * † ♦ or A44XDD * ♦	† Jewel ♦ Diamond * Includes Cartridge

CABINETS & CABINET PARTS

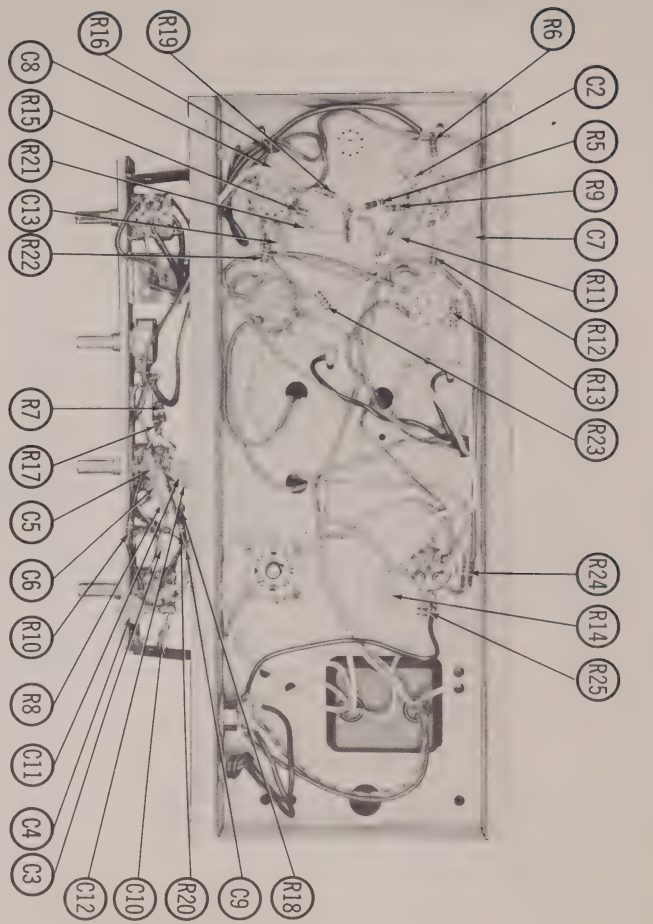
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

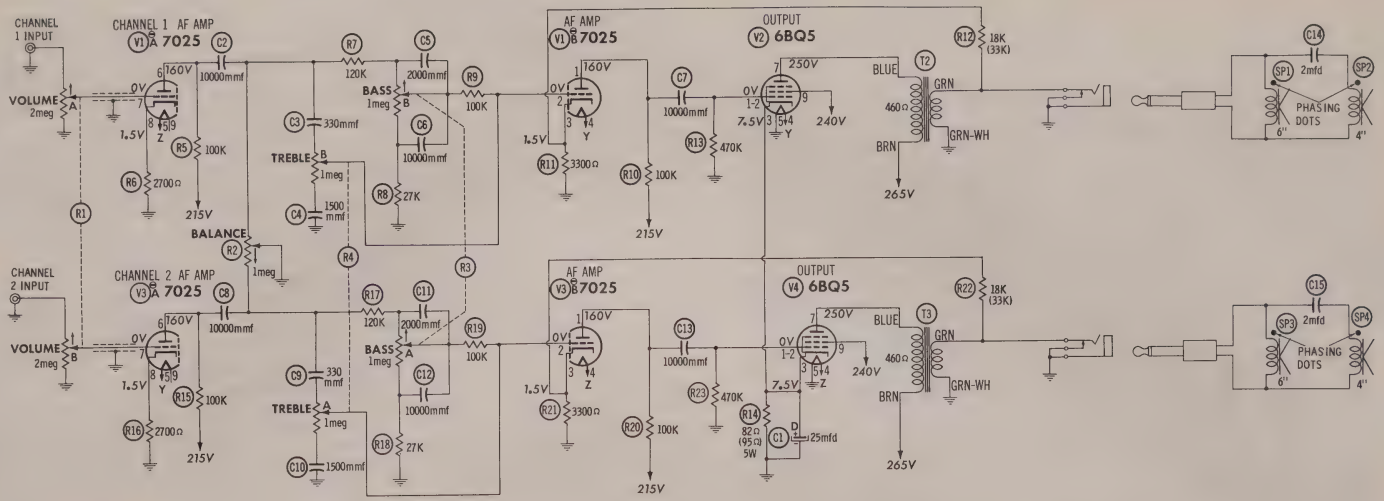
NAME	PART NO.	DESCRIPTION
Case	92X104-1	Model EP1050-1
Case	92X104-2	Model EP1050-1A
Speaker Box	11X2225-1	Right Channel Model EP1050-1
Speaker Box	11X2225-2	Right Channel Model EP1050-1A
Speaker Box	11X2224-1	Left Channel Model EP1050-1
Speaker Box	11X2224-2	Left Channel Model EP1050-1A

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW

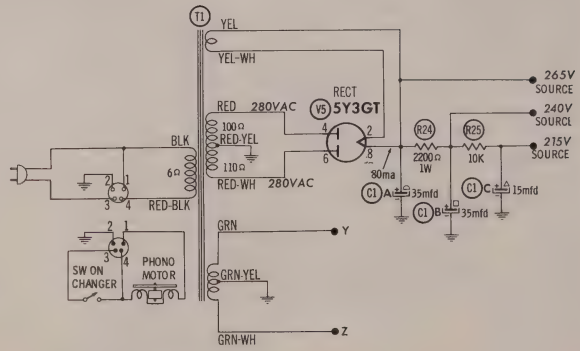




RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†110K	130K	3000Ω	.6Ω	.6Ω	†110K	0Ω	2700Ω	3.5Ω
V2	6BQ5	470K	470K	82Ω	.4Ω	0Ω	NC	†460Ω	NC	†2200Ω
V3	7025	†110K	130K	3000Ω	.6Ω	.6Ω	†110K	0Ω	2700Ω	3.5Ω
V4	6BQ5	470K	470K	82Ω	.4Ω	0Ω	NC	†460Ω	NC	†2200Ω
V5	5Y3GT	NC	¶	NC	100Ω	NC	110Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION.



WEBCOR MODELS
EP1050-1, -1A (Ch. 14X310-1)

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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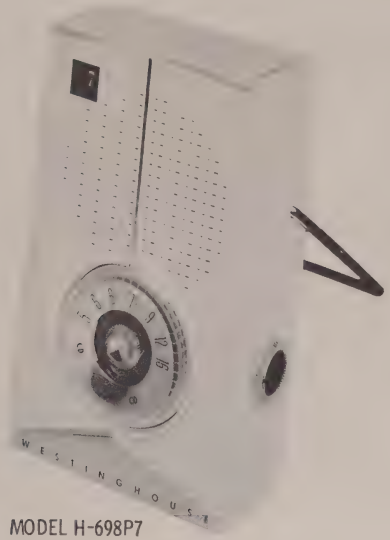
PHOTOFACT® Folder with CIRCUITRACE®

WESTINGHOUSE MODELS H-697P7, H-698P7, H-699P7 (Ch. V-2393-3)

WESTINGHOUSE MODELS H-697P7, H-698P7, H-699P7 (Ch. V-2393-3)



MODEL H-698P7

WESTINGHOUSE MODELS H-697P7, H-698P7, H-699P7 (Ch. V-2393-3)

TRADE NAME	Westinghouse Models H-697P7, H-698P7, H-699P7 (Ch. V-2393-3)
MANUFACTURER	Westinghouse Electric Corp., Metuchen, N. J.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	6 Volts DC
RATING	6.2MA@6 Volts DC(No Signal, Min Volume) 8.5MA@6 Volts DC(Signal, Normal Volume)
TUNING RANGE—BROADCAST	535 – 1625KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1, A2, A3,.....GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531

A4, A5.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

A6.....GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1625KC	"	"	A4	Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC Signal	"	A5	"
4.		"	600KC	Tune to 600KC Signal	"	A6	Adjust for maximum output. Repeat Steps 2, 3 & 4.

DISASSEMBLY INSTRUCTIONS

1. Remove tuning knob (Loop string under knob and pull up).
2. Loosen two screws on cabinet back. Remove back.
3. Remove two screws holding chassis to cabinet front.
4. Remove chassis, battery holder, speaker, spacers and grommets.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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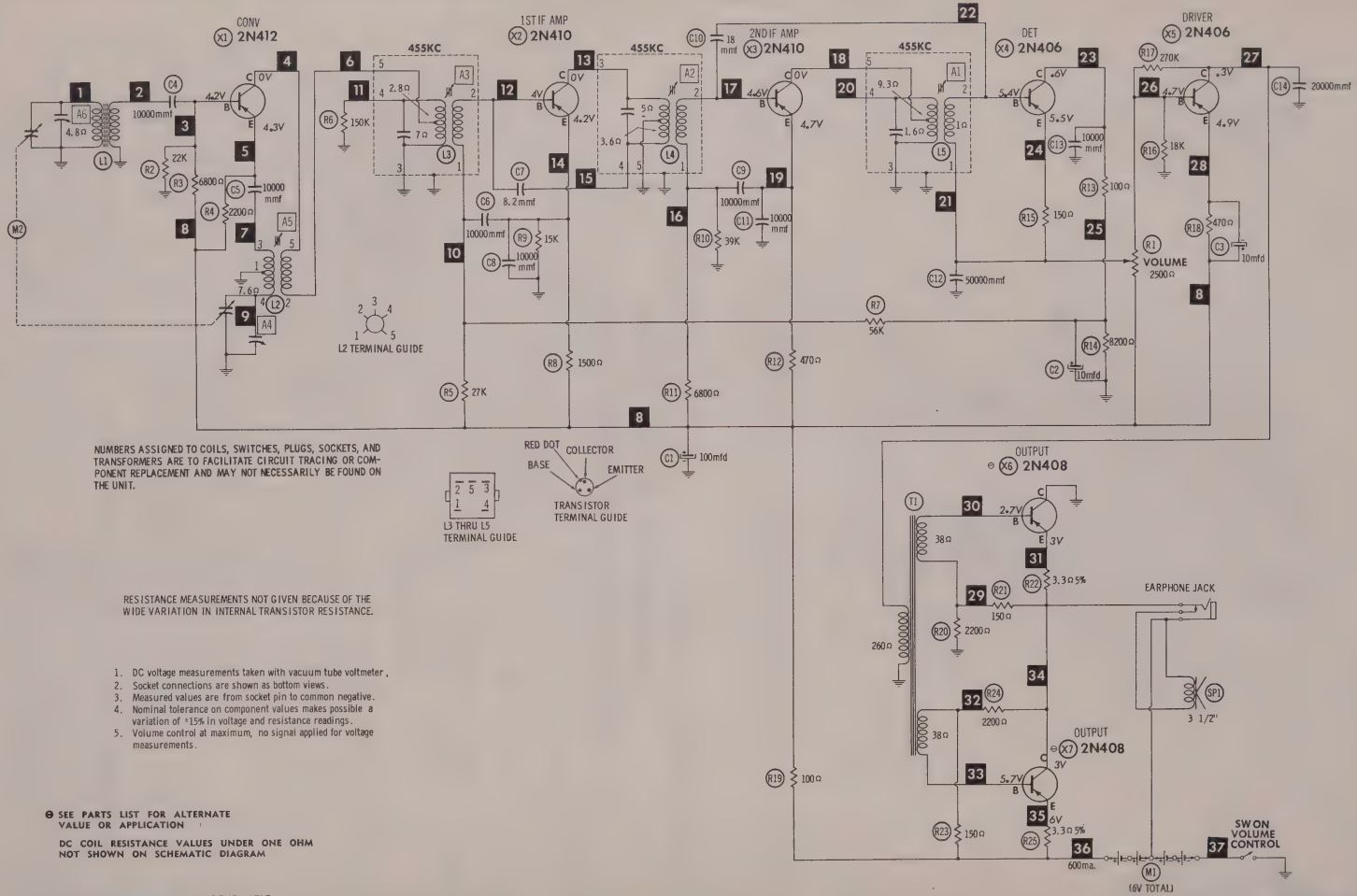
JF545

SET 481 FOLDER 14



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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WESTINGHOUSE MODELS H-697P7, H-698P7, H-699P7 (Ch. V-2393-3)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N412	Converter		2N412	2N486	2N412	PNP
X2	2N410	1st IF Amplifier		2N410	2N483	2N410	PNP
X3	2N410	2nd IF Amplifier		2N410	2N483	2N410	PNP
X4	2N406	Detector		2N406	2N362	2N406	PNP
X5	2N406	Driver		2N406	2N362	2N406	PNP
X6	2N408 *	Output		2N408	2N632	2N408	PNP) Matched
X7	2N408 *	Output		2N408	2N632	2N408	PNP) Pair

* Alternate Type 2N406.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	100	7	218V012H15	PWE10100	EC100-10	TT15X100	ML100-15	TE-1119, 3	
C2	10	6	218V012H18	PWE6010	EC10-6	TT6X10	ML10-6	TE-1087	
C3	10	6	218V012H18	PWE6010	EC10-6	TT6X10	ML10-6	TE-1087	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C7	8.2		NPO-S1 8.2	TCZ-8R2	C10V82C		CNO-582	10TCC-V82
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C10	18		DI-18	TCZ-18	C10Q18C	CCD-180	CNO-418	10TCC-Q18
C11	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C12	50000		BPD-05	DD-503	H-05S5	6DP-3-503	GP150	5HK-S50
C13	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C14	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	2500Ω	½	270V068H01					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

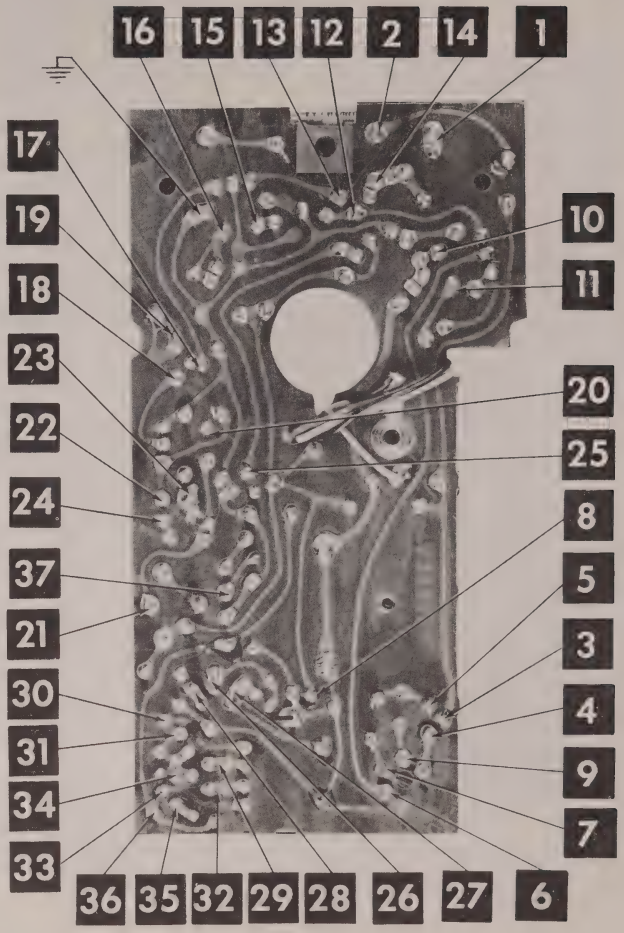
ITEM No.	RATING	REMARKS
R2	22K	
R3	6800Ω	
R4	2200Ω	
R5	27K	
R6	150K	
R7	56K	
R8	1500Ω	
R9	15K	

ITEM No.	RATING	REMARKS
R10	39K	
R11	6800Ω	
R12	470Ω	
R13	100Ω	
R14	8200Ω	
R15	150Ω	
R16	18K	
R17	270K	

ITEM No.	RATING	REMARKS
R18	470Ω	
R19	100Ω	
R20	2200Ω	
R21	150Ω	
R22	3.3Ω 5%	
R23	150Ω	
R24	2200Ω	
R25	3.3Ω 5%	

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Westinghouse PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	310V029H01						
L2	Osc. Coil	230V057H01						
L3	1st IF Trans.	235V047H03						
L4	2nd IF Trans	235V047H01						
L5	3rd IF Trans.	235V047H02						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3	1	430V076H01						
		SEC. 2							
	3	1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	3½"	PM	44-46Ω	570V062H01		

BATTERIES

ITEM No.	VOLTAGE	Westinghouse PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			Z		1015		M15	4 Required

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M2	Tuning Cap	330V020H02	2 Gang

CABINETS & CABINET PARTS

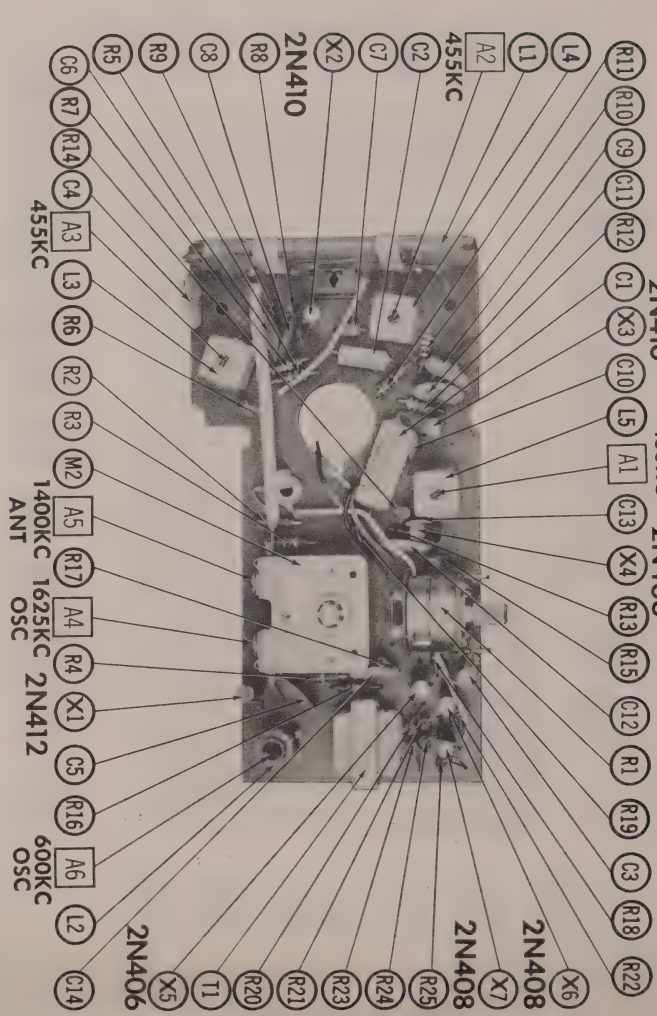
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	550V080H03	Tuning
Knob	559V048H01	Volume (Includes Compression Ring)
Cabinet	513V026H04	Model H-697P7
Cabinet	513V026H05	Model H-698P7
Cabinet	513V026H06	Model H-699P7
Handle	558V151H01	
Escutcheon	555V026H04	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

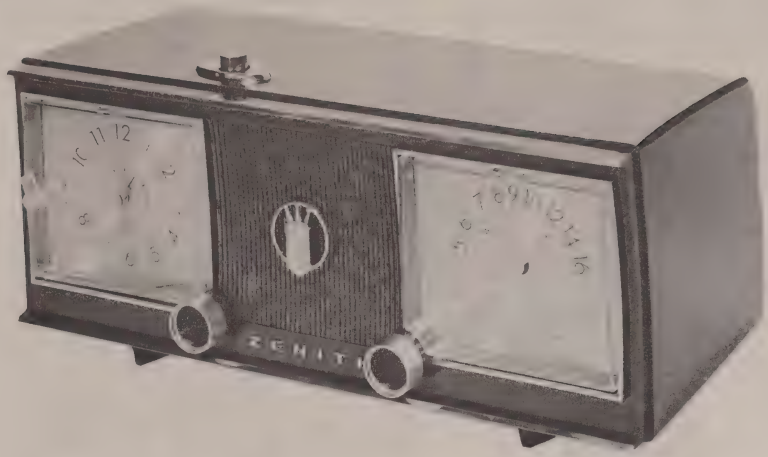
CHASSIS—TOP VIEW



PHOTOFACT® Folder

ZENITH MODELS C624C, V, W (Ch. 6C03)

ZENITH MODELS C624C, V, W (Ch. 6C03)



TRADE NAME	Zenith Models C624C, C624V, C624W (Ch. 6C03)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated 6 Tube AM Receiver With Electric Clock
POWER SUPPLY	110-120 Volts AC, 60 Cycles
RATING	28 Watts, .3 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535 - 1620KC

ZENITH MODELS C624C, V, W (Ch. 6C03)

ALIGNMENT INSTRUCTIONS

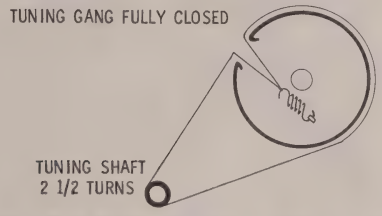
ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1 thru A4 ..... GENERAL CEMENT #8282, 8606, 8606L, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A6, A7 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5mfd	High side to pin 7 (grid) of Converter. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	1400KC	"	A6, A7	"

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 481 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆	GENERAL ELECTRIC ◆	RAYTHEON ◆	SYLVANIA ◆

ITEM No.	USE	TYPE
V1	RF Amplifier	12BA6
V2	Converter	12BE6
V3	IF Amplifier	12BA6
V4	Det. - AVC - AF Amp.	12AV6
V5	Output	35C5
V6	Rectifier	35W4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■80	150	22-2351	AFH2-19	XB0181	FP216	TMD-16	TVL-2442	
B	▲40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C3	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C4	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	5GA-T47
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C7	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	63-3997	B-59	A47-500K-S	Q11-133	U-50	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

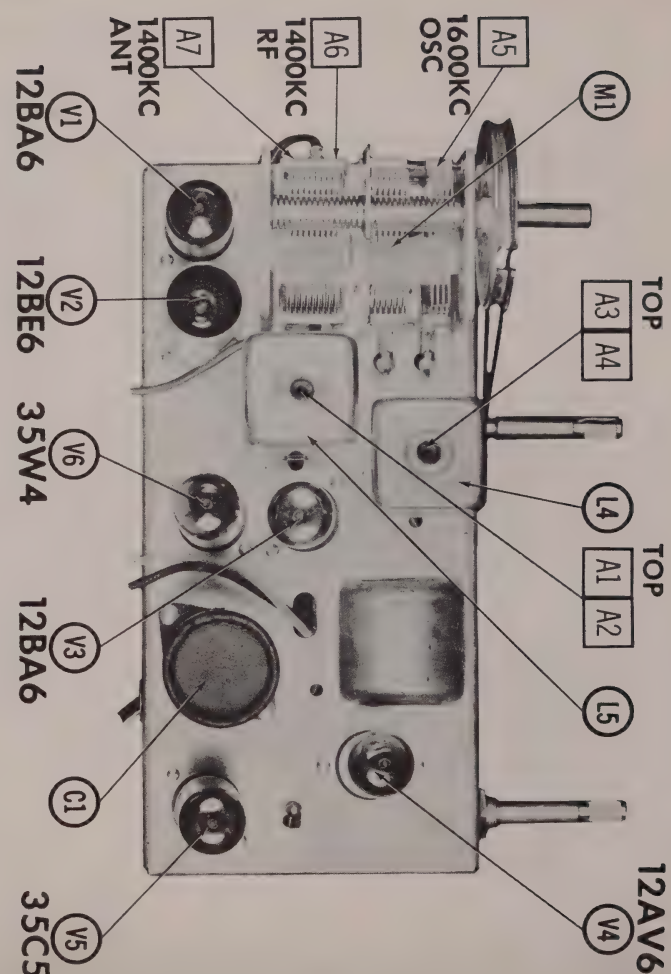
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	15K	
R3	330Ω	
R4	22K	
R5	1000Ω	
R6	2.2meg	

ITEM No.	RATING	REMARKS
R7	68Ω	
R8	47K	
R9	470K	
R10	4.7meg	
R11	470K	

ITEM No.	RATING	REMARKS
R12	150Ω	
R13	18Ω	
R14	1000Ω 1W	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		ZENITH PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	S-46237						
L2	RF Trans	S-22851						
L3	Osc. Coil	S-22852						
L4	Input IF	95-1101	16-6666	16-6666	BC-368	12-C1 *	RF-1 *	
L5	Output IF	95-1102	16-6770 *	16-6770 *	BC-355 *	12-C6 *		

* Remove center bolt mounting bracket and use adapter plate.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2750Ω	3-4Ω	25-1568							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	49-879	4A07 ①	① Fabricate mounting bracket.

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M1	Tuning Cap.	22-3161	3 Gang (Ant. 15-296mmf, RF 10-180mmf, Osc. 5-67mmf)
M2	Clock	172-9	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

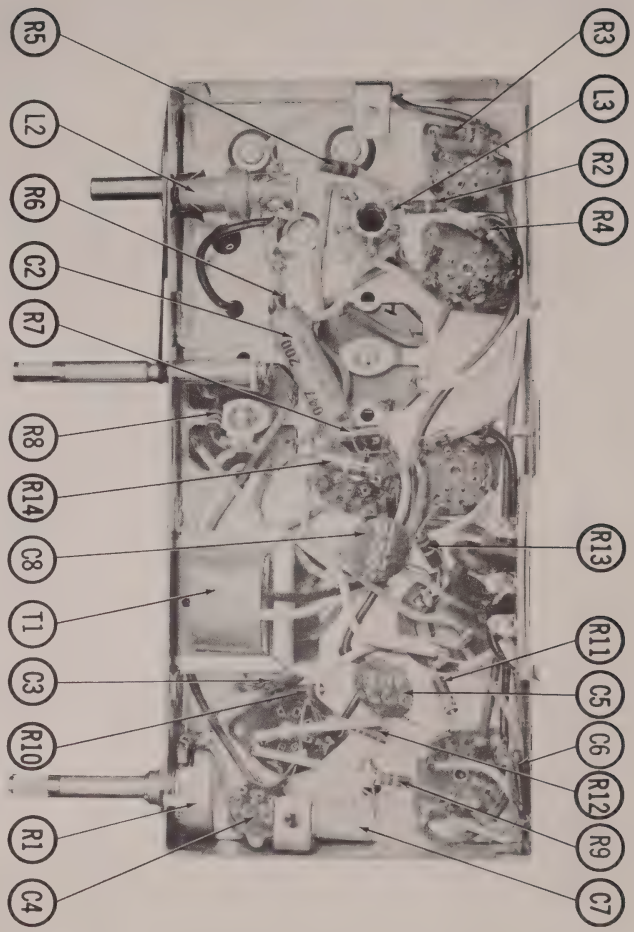
NAME	PART NO.	DESCRIPTION
Knob	46-2162	Tuning, Volume
Knob	46-2120	Snooze Alarm
Knob	46-2119	Clock (2 used)
Knob Escutcheon	57-2679	
Dial Pointer	59-348	
Dial Scale	26-625	
Radio Crystal	192-272	
Clock Crystal	192-273	
Cabinet	14-2652	Model C624W
Cabinet	14-2653	Model C624C
Cabinet	14-2654	Model C624V

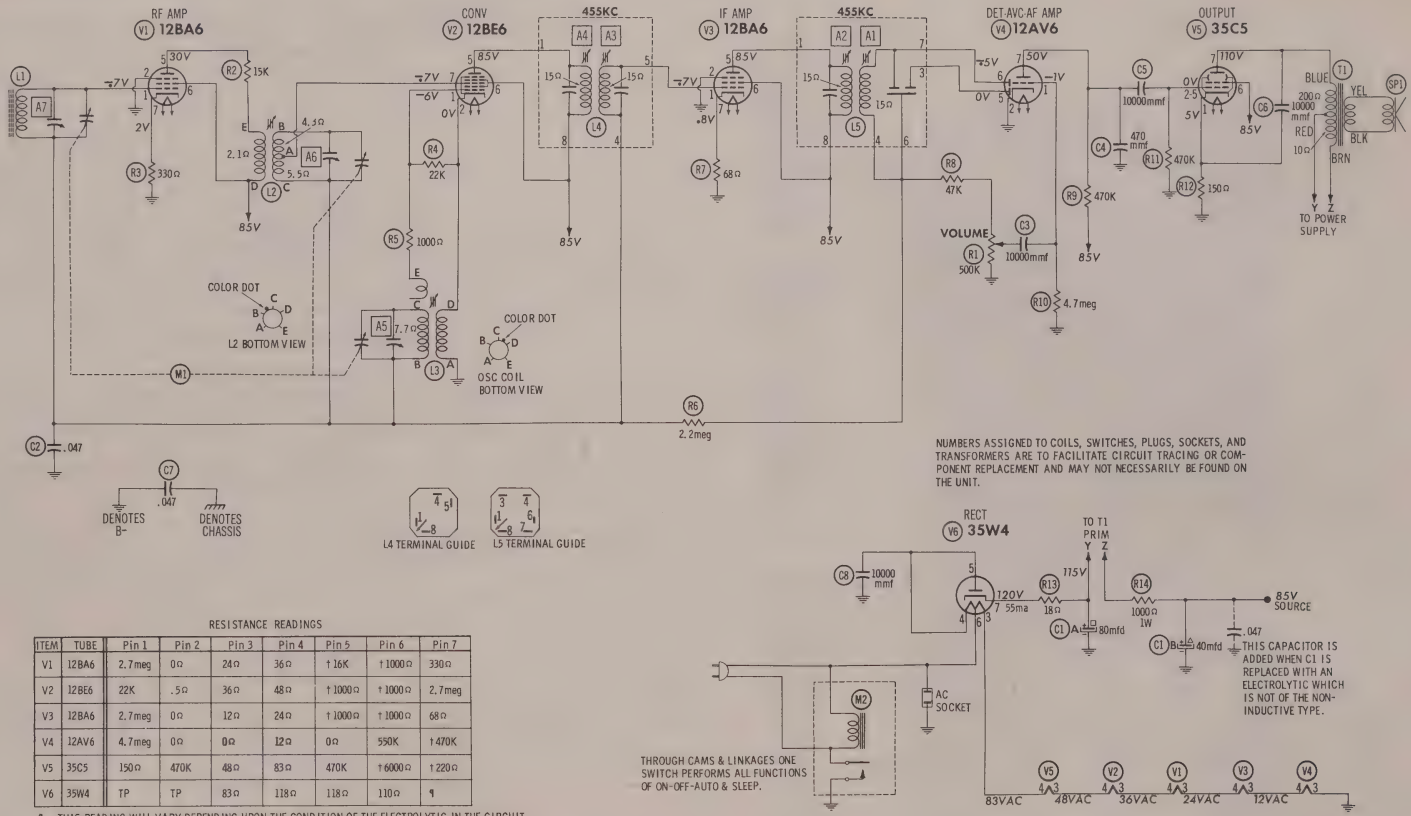
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	2.7meg	0Ω	24Ω	36Ω	†16K	†1000Ω	330Ω
V2	12BE6	22K	.5Ω	36Ω	48Ω	†1000Ω	†1000Ω	2.7meg
V3	12BA6	2.7meg	0Ω	12Ω	24Ω	†1000Ω	†1000Ω	68Ω
V4	12AV6	4.7meg	0Ω	0Ω	12Ω	0Ω	550K	†470K
V5	35C5	150Ω	470K	48Ω	83Ω	470K	†6000Ω	†220Ω
V6	35W4	TP	TP	83Ω	118Ω	118Ω	110Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V6.
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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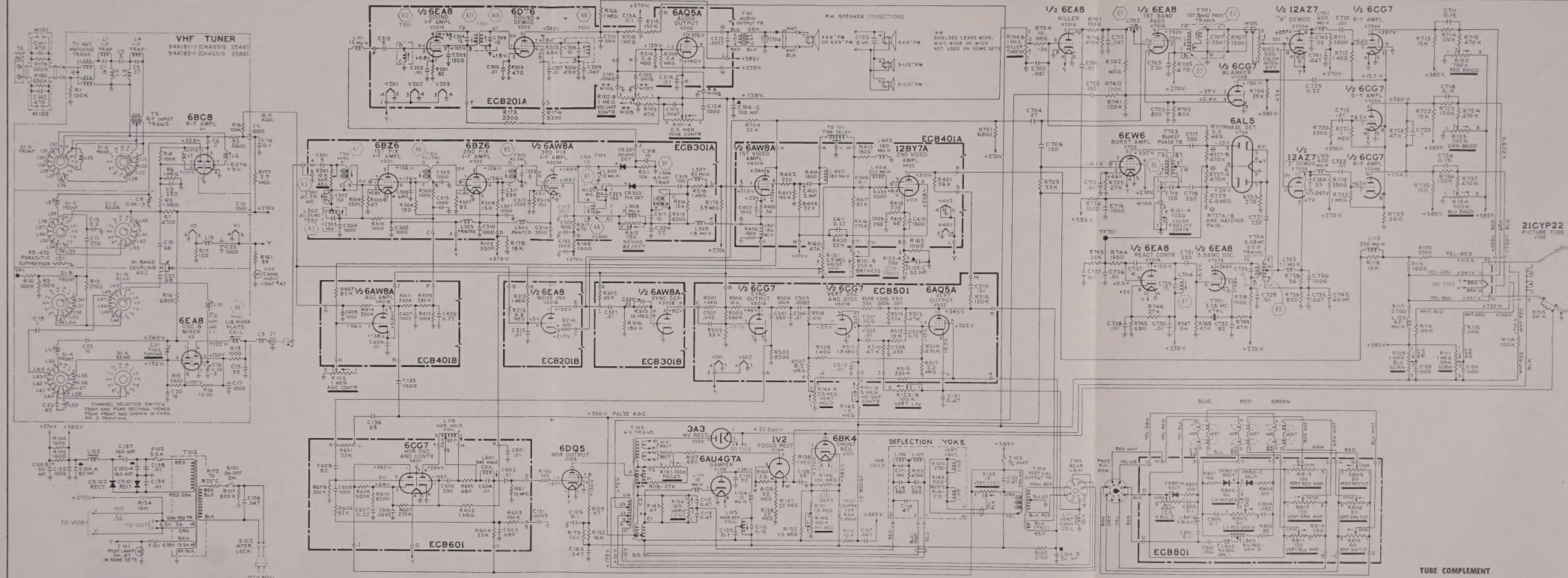
ZENITH MODELS C624C, V, W (Ch. 6C03)



ADMIRAL MODELS C71N21, C71N22, C71N23, C71N31, C71N37, L71N41, L71N42, L71N43, L71N52, L71N57, T71N10, T71N12, T71N13, (CH. 25A6, 25B6)

SCHEMATIC NOTES

Resistance values in ohms; capacitor values less than 1, in Microfarads; and capacitor values 1 or greater are in Micronicrofarads unless otherwise specified.

Note: K=Rx 1,000; Meg=Rx 1,000,000; MF=microfarad.

Direction of arrows at controls indicates clockwise rotation.

*Voltages measured with 1 Megohm, ½ watt resistor in series with meter probe.

CONDITIONS FOR MEASURING VOLTAGES

Warning: Pulsed high voltages are present at caps of V103, V105, V107 and at pin 3 of V106. **Do not** attempt to measure voltages at these points without suitable equipment. A VTVM with a 30,000 volt high voltage probe should be used when measuring picture tube high voltage (at ultor anode socket on picture tube).

- Voltages measured with no signal input.
- Line Voltage: 117 volts AC.
- Voltages measured with VTVM.

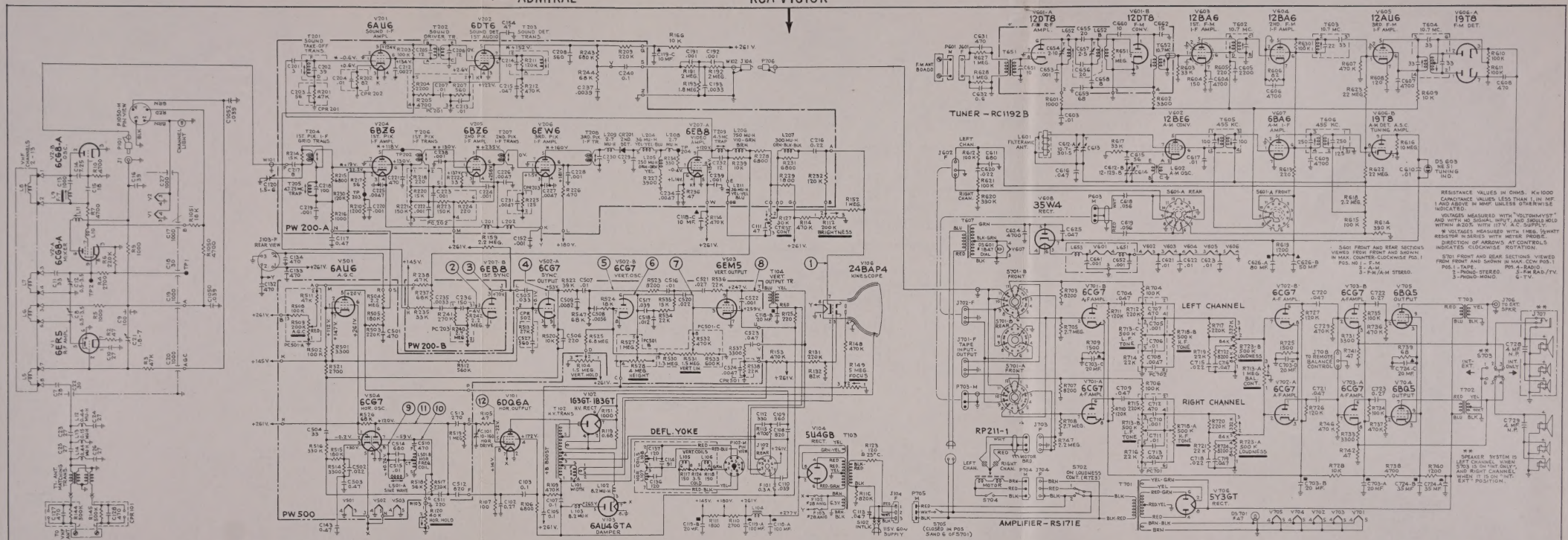
TUBE COMPLEMENT

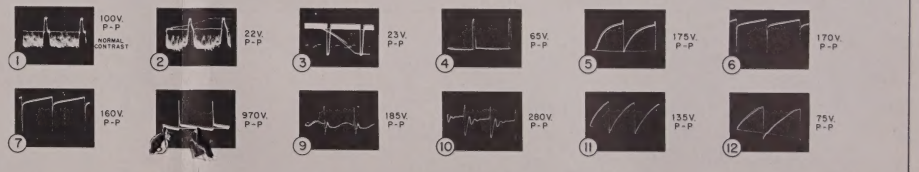
V1	6BC8	V301	6BZ6	V704	6CG7
V2	6EA8	V302	6BZ6	V705	6CG7
V103	3A3	V303	6AW8A	V706	6AL5
V104	1V2	V401	6AW8A	V707	6EA8
V105	6DQ5	V402	12BY7A	CR101	93B20-1
V106	6AU4GTA	V501	6CG7	CR102	93B20-1
V107	6BK4	V502	6AQ5A	CR301	93C21-6
V108	21CYP22	V601	6CG7	CR302	93C21-6
V201	6EA8	V701	6EA8	CR801A	
V202	6DT6	V702	6EW6	CR801B	93B19-1
V203	6AQ5	V703	12AZ7	CR801C	

Schematic Diagram Courtesy of Admiral Corporation

← ADMIRAL

RCA VICTOR →





All voltages measured with "Volt-Ohmyst" to chassis ground with no signal input. Voltages should hold within ± 20% with 117v. a-c supply.

*Measured with 1 megohm, ½ watt resistor in series with meter probe.

Direction of arrows at controls indicates clockwise rotation.

Balloons ① ② etc., shown on schematics indicate points of observation of the waveforms shown below the schematic.

RCA VICTOR MODELS 240KV775SU, 240KV776SU (CH. KCS127AE, RC-1192B, RS-171E)

Schematic Diagram Courtesy of Radio Corporation of America

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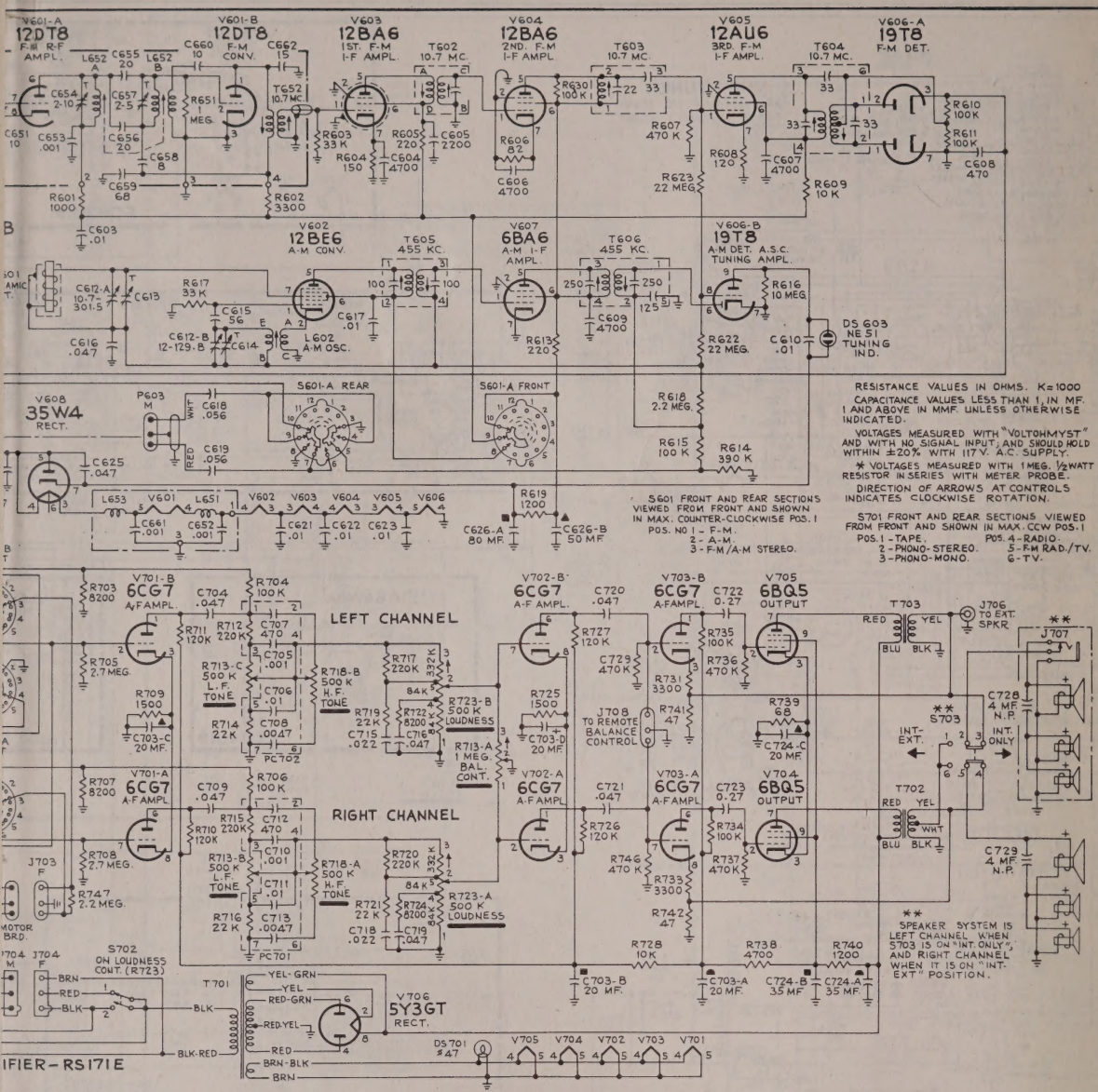
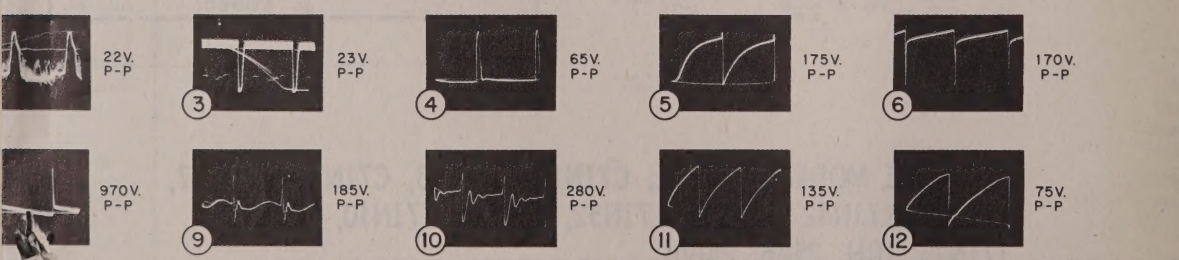

V601-A 12DT8 F-M R-F AMPL.
V601-B 12DT8 F-M CONV.
V603 12BA6 1ST. F-M I-F AMPL.
V604 12BA6 2ND. F-M I-F AMPL.
V605 12AU6 3RD. F-M I-F AMPL.
V606-A 19T8 F-M DET.
V602 12BE6 A-M CONV.
V607 6BA6 A-M I-F AMPL.
V606-B 19T8 A-M DET. A.S.C. TUNING AMPL.
V608 35W4 RECT.
S601-A REAR
S601-A FRONT
DS 603 NE 51 TUNING IND.
RESISTANCE VALUES IN OHMS. K=1000
CAPACITANCE VALUES LESS THAN 1, IN MF. 1 AND ABOVE IN MMF. UNLESS OTHERWISE INDICATED.
VOLTAGES MEASURED WITH "VOLTOHMYST" AND WITH NO SIGNAL INPUT; AND SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY.
* VOLTAGES MEASURED WITH 1 MEG. ½ WATT RESISTOR IN SERIES WITH METER PROBE.
DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.
S601 FRONT AND REAR SECTIONS VIEWED FROM FRONT AND SHOWN IN MAX. COUNTER-CLOCKWISE POS. 1
POS. NO 1 - F-M.
2 - A-M.
3 - F-M/A-M STEREO.
S701 FRONT AND REAR SECTIONS VIEWED FROM FRONT AND SHOWN IN MAX. CCW POS. 1
POS. 1 - TAPE.
2 - PHONO-STEREO.
3 - PHONO-MONO.
POS. 4 - RADIO.
5 - F-M RAD./TV.
6 - TV.
V701-B 6CG7 A-F AMPL.
V701-A 6CG7 A-F AMPL.
LEFT CHANNEL
RIGHT CHANNEL
V702-B 6CG7 A-F AMPL.
V702-A 6CG7 A-F AMPL.
V703-B 6CG7 A-F AMPL.
V703-A 6CG7 A-F AMPL.
V705 6BQ5 OUTPUT
V704 6BQ5 OUTPUT
T703
T702
J706 TO EXT. SPKR.
J707
S703 INT-EXT. INT. ONLY
J708 TO REMOTE BALANCE CONTROL
S702 ON LOUDNESS CONT. (R723)
T701
V706 5Y3GT RECT.
** SPEAKER SYSTEM IS LEFT CHANNEL WHEN S703 IS ON "INT. ONLY", AND RIGHT CHANNEL WHEN IT IS ON "INT-EXT" POSITION.



Schematic Diagram Courtesy of Radio Corporation of America